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ABSTRACT

Reported are international and American curricular development projects in science and mathematics. Each report contains information under the following headings: Project Title; Project Headquarters; Principal Professional Staff; Project Support; Project History; Present Commercial Affiliations; Project Objectives; Methods of Instruction Used in the Project; Specific Subjects, Grade, Age, and Ability Levels; Materials Produced; Materials Available Free; Materials Purchasable; Language In Which Materials Were Written; Language Into Which Materials Have Been or Will Be Translated; Additional Materials Being Developed; Project Implementation; Teacher Preparation; Project Evaluation; Project Publicity; Brief Summary of Project Activities Since 1968 Report; and Plans for the Future. Indices list projects by geographic area, by subject matter area and, for American projects, by grade level. Completed or inactive projects are also listed. (EB)

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SCIENCES

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Seventh Report of the International Clearinghouse on Science and Mathematics Curricular Developments 1970

EDITED
UNDER THE
DIRECTION OF
J. DAVID LOCKARD

A
JOINT
PROJECT
OF
THE

Commission on
Science Education
American Association for
the Advancement
of Science

Science
Teaching Center
University of Maryland
College Park
Maryland

SE 008 828

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SEVENTH REPORT OF THE
INTERNATIONAL CLEARINGHOUSE
ON
SCIENCE AND MATHEMATICS CURRICULAR DEVELOPMENTS
1970

Edited Under the Direction of
J. David Lockard

A JOINT PROJECT
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American Association for the Advancement of Science
and the
Science Teaching Center, University of Maryland

FOREWARD

When it was established in 1962, the Commission on Science Education of the American Association for the Advancement of Science embarked on two major projects. One was the development of a science program for children in elementary schools. This program Science--A Process Approach is described elsewhere in this report. The second was the preparation and publication of an annual report of new science and mathematics curriculum developments. Dr. J. David Lockard of the University of Maryland, Science Teaching Center, agreed to collect and publish the data on new curriculum developments for the Commission. Under his leadership the report has grown each year and now includes reports of curriculum developments from many countries. The Commission and its directors are most grateful for the excellent work that Dr. Lockard and his staff have done in compiling this report.

The Commission has an active concern for the improvement of science education both in and out of school at all levels; for example, from a recent Commission study of the role of science in the training of technicians came two brochures on technical education. Another recent activity has been the preparation of guidelines for the preservice science education of elementary school teachers. The report of the guidelines project is available from the American Association for the Advancement of Science. Work has just begun on the preparation of a similar set of guidelines for the education of secondary school science and mathematics teachers. These guidelines will be published in 1971. The Commission has recently published an extensive bibliography of references on science and society. Other activities of the Commission are described in the Commission Newsletter. Activities of other individuals and groups are reported in the American Association for the Advancement of Science quarterly publication Science Education News.

American Association for the Advancement of Science	John R. Mayor Director of Education
1515 Massachusetts Avenue, N.W. Washington, D.C. 20005	Arthur H. Livermore Deputy Director of Education

express here publicly our sincere thanks for all the fine help we have received over the years.

There are quite a number of organizations that are directly and indirectly involved with the production of the International Clearinghouse Report. Those most closely associated are the American Association for the Advancement of Science (AAAS), United Nations Educational, Scientific and Cultural Organization (UNESCO) and the National Science Foundation, which furnishes financial aid. Thanks are given to all the fine people who have contributed in any way to this endeavor for its successes while any mistakes or omissions should be attributed to this director.

You are encouraged to send us any additional supplementary information on projects already in the report, or information on other on-going curriculum projects that may have been consciously or unconsciously omitted. Some were received too late for publication. You are encouraged when here in the Washington area to visit the Science Teaching Center and the International Clearinghouse and please let us know how we may be of further assistance.

Science Teaching Center	J. David Lockard, Ph.D.
University of Maryland	Director

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Science Teaching Center — J. David Lockard, Ph.D.
University of Maryland — Director

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A. PROJECT TITLE: AFRICAN MATHEMATICS PROGRAM (AMP).

B. PROJECT DIRECTOR: Mr. Hugh P. Bradley, African Mathematics Program, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160. (617)969-7100.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Copies of materials; literature about the program.

D. PRINCIPAL PROFESSIONAL STAFF: The African Mathematics Program employs, on a consulting basis, a staff of African and American mathematicians at workshops each summer in Africa to develop mathematics course materials. Some of these people also lecture in institutes to train African teachers to use the new materials. The activities are carried out under the direction of a Steering Committee of African and American members. The Executive Committee consists of R. P. Dilworth, California Institute of Technology; W. T. Martin, M.I.T. (Chairman); C. Modu, West African Examinations Council, Lagos, Nigeria; W. Prenowitz, Brooklyn College; Onyerisara Ukeje, University of Nigeria, Nsukka, E. Nigeria; Awadagin Williams, Fourah Bay College, Sierra Leone; Hugh P. Bradley, Director, African Mathematics Program.

E. PROJECT SUPPORT:
1. Organizational agency: Education Development Center.
2. Funding agencies: United States Agency for International Development (US/AID); Ford Foundation.

F. PROJECT HISTORY:
1. Principal originators: Prof. J. R. Zacharias, M.I.T.; Prof. W. T. Martin, M.I.T.
2. Date and place of Initiation: 1961; Cambridge, Mass.
3. Overall project purpose: To develop a modern mathematics program from Standard I to School Certificate for English-speaking African countries.

G. PRESENT COMMERCIAL AFFILIATIONS: Science Research Associates, Chicago, Illinois; Science Research Associates, Ltd., England.

H. PROJECT OBJECTIVES: Following a conference attended by African, American and British educators in 1961, it was decided to initiate curriculum reform programs for Africa. In particular, programs in mathematics, science, social studies and teacher training were recommended. It was felt that the work of curriculum reform in mathematics in the U.S.A and in Britain was sufficiently advanced to make possible a positive contribution to African education; thus a program for the form of the teaching of mathematics from Standard I up to School

Certificate was undertaken. It is the aim of the program to produce new mathematical materials in the following four areas: text materials for primary school; text materials for secondary school; text materials for African teacher training colleges; and tests and examinations based on these materials.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Lectures.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics from Standard I to School Certificate students. Also, teacher training materials.

K. MATERIALS PRODUCED:
Student texts and teachers guides are available for the following titles, in preliminary editions:

Primary Six-Year Course
1. Primary One.
2. Primary Two.
3. Primary Three.
4. Primary Four.
5. Primary Five.
6. Primary Six.

Five-Year Course
7. Secondary One.
8. Secondary Two.
9. Secondary Three - algebra, geometry.
10. Secondary Four - algebra, geometry.
11. Secondary Five.

Four-Year Course
12. Secondary C One - algebra, geometry.
13. Secondary C Two - algebra, geometry.
14. Secondary C Three - algebra, geometry.
15. Secondary C Four.
16. Entebbe Mathematics Teachers' Handbook, Primary I-III.

Basic Concepts of Mathematics
An Introductory Text for Teachers
17. Volume I - Structure of Arithmetic.
18. Volume II - Structure of Arithmetic.
19. Volume III - Foundations of Geometry.
20. Volume IV - Measurement, Functions and Probability.
21. Additional Mathematics - O level.
22. Advanced Mathematics - A level.
23. "New Mathematics in the Primary School".
24. "Assigning Fractions to Points on a Number Line".
25. "Folding and Turning Symmetries".

More than one million copies or adaptations have been printed by African Ministries at their own expense. Main African publications are in Ethiopia and Tanzania.

L. MATERIALS AVAILABLE FREE: Materials listed in Section K are available for limited trial use to the Ministries of African countries participating in the program. In special circumstances inspection sets of the materials are available to groups in the U.S. having a particular responsibility for mathematics education in Africa.

M. MATERIALS PURCHASABLE:

Primary One, Pupil Book	Sh 5/6.-
Primary One, Teacher's Guide	Sh 15/-
Basic Concepts, Vol. I	Sh 15/-
Basic Concepts, Vol. II	Sh 12/6.-
Secondary C One Algebra, Pupil Book	Sh 18/-
Secondary C One Geometry, Pupil Book	Sh 15/-
Primary Two, Pupil Book	Sh 6/6.-
Primary Two, Teacher's Guide	Sh 21/-

Available from: Science Research Associates, Ltd., Newtown, Reading Road, Henley-on-Thames, Oxfordshire, England.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Swahili, Amharic.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Twelve audio tapes for teacher training purposes.

Q. PROJECT IMPLEMENTATION: (Latest definite information as of 1968)

1. Number of teachers who have adopted the entire course: 2,000.
2. Number of students involved: 80,000.
3. Number of schools involved: Not answered.
4. Total number of teachers using any of the materials: 2,000 +.
5. Total number of students using any of the materials: 80,000 +.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Items 1, 2 are definitive as of 1968. No accurate record of increase since 1968.
7. Name and location of selected schools where the course is being taught: South Labadi School, Accra, Ghana.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: African supervisors; in-service courses with African and U. S. A. lecturers.
2. Activities conducted for pre-service and in-service teacher training: a. Plans for pre-service teacher training courses are being developed.

b. Seventy-one institutes for in-service training have been given in ten countries.
Average cost, $3,260.00.
Program gives an average of $3,000 to each institute. All additional expenses are covered by African Ministries.
Program contributes travel,subsistence, stipend for visiting American lecturer.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers:
Teacher training texts - Basic Concepts of Mathematics, Vol. I-IV. Handbook for Primary Teachers.
Films: a. "New Mathematics in the Primary School."
b. "Assigning Fractions to Points on a Number Line."
c. "Folding and Turning Symmetries."

Not commercially available.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff and by a committee of International Cooperation of the Conference Board of Mathematical Sciences at the request of US/AID.
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished research: Not answered.

T. PROJECT PUBLICITY: Articles have appeared in the American Mathematical Monthly and in the West African Journal of Education.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Eleven teacher training institutes held in Ethiopia, Ghana, Liberia, Malawi, Nigeria, Uganda, Sierra Leone and Tanzania. Four week meeting to develop texts for the Entebbe Mathematics Series. Publication of two texts for the Entebbe Series: Advanced Mathematics, Vol. I; Additional Mathematics, Vol.'s I and II. Production and distribution of three films.

V. PLANS FOR THE FUTURE: Publication of Advanced Mathematics, Vol. II and Teacher's Guide; Guide to the Entebbe Primary Series; Syllabus Sourcebook for African Teacher Training Colleges. Production of sixteen audio tapes for African Teacher Education.

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A. PROJECT TITLE: AFRICAN PRIMARY SCIENCE PROGRAM (APSP).

B. PROJECT DIRECTOR: Mr. Robert W. Carlisle, African Primary Science Program, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160. (617)969-7100.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Copies of program materials, including films, by special arrangement.

D. PRINCIPAL PROFESSIONAL STAFF: R. W. Carlisle, Project Director; R. H. Robins, Administrative Director; W. U. Walton, D. E. B. Chaytor, Consultants; Mrs. M. J. Neuendorffer, Editor; R. Francis, E. Godfredsen, F. Gornall, C. Hale, S. Manning, D. Seager, J. Seawell, Science Educators.

E. PROJECT SUPPORT:
1. Organizational agency: Education Development Center.
2. Funding agencies: US/AID. Early support also came from The Ford Foundation.

F. PROJECT HISTORY:
1. Principal originator: Dr. Jerrold R. Zacharias, Physics Department, M. I. T.
2. Date and place of Initiation: February 1965; Kano, Nigeria.
3. Overall project purpose: To introduce modern methods and materials for teaching science to primary schools of English speaking Tropical Africa.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Project was originally undertaken as a research program to determine to what extent new ideas developed for teaching science to primary school children in developed parts of the world can be adapted for use in Africa. Special emphasis is placed on so-called "discovery method" in teaching, using simple apparatus and subject matter relevant to Africa. APSP history and objectives stated in a Summary of the African Primary Science Program.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Seminars and Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science: Primary schools K - 8.

K. MATERIALS PRODUCED:
1. "A Report of an African Education Program" 1967.

Activities for Lower Primary.

2. Introduction.
3. Arts and Crafts.
4. Cooking.
5. Construction.
6. Dry Sand.
7. Wet Sand.
8. Exploring the Local Community.
9. Exploring Nature.
10. Plants in the Classroom.
11. Playground Equipment.
12. Water.
13. Woodwork.

Pupil's Book.

14. Making a Magnifier.

Teacher's Guides.

15. Ask the Ant Lion.
16. Buds and Twigs.
17. Construction with Grass.
18. Chicks in the Classroom.
19. Colours, Waters, and Paper.
20. Estimating Numbers.
21. Inks and Papers.
22. Making Paints.
23. Making a Magnifier.
24. Measuring Time - Part I: Making Many Simple Clocks.
25. Measuring Time - Part II: Making Clocks That Measure Hours.
26. Mosquitoes.
27. Powders.
28. Small Animals.
29. Torch Batteries and Bulbs.

Science Library Series.

30. Chima Makes a Clock (2 colours)
31. The Moon Watchers.
32. Stars Over Africa (Book 1).
33. Strangers in the Sky (Book 2).
34. Using the Sky (Book 3).
35. How The Sky Looks (Book 4).

Films.

36. The Village School.
37. The Village Teacher.

L. MATERIALS AVAILABLE FREE: All printed materials are in preliminary form and are available free in limited supply as samples only. The films are not available in this country.

M. MATERIALS PURCHASABLE: None at the present time.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: All trial materials are in English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED:
Swahili versions of some program materials. No other translation plans at present.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

Teachers' Guides.

1. Balancing and Weighing.
2. Homemade Solutions.
3. Making Things Look Bigger: Making a Microscope.
4. Ourselves: Activities and Experiments.
5. Pendulums.
6. A Scientific Look at Soil.
7. Soldering.
8. Sound: Musical Instruments.
9. Tools for the Classroom.
10. Tools in the Village.

Pupil's Book.

11. Making A Microscope.

Science Library Series.

12. Tilapia.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Definite number unavailable: probably around 2,000.
2. Number of students involved: Estimated: 60,000.
3. Number of schools involved: Estimated 500.
4. Total number of teachers using any of the materials: Not answered.
5. Total number of students using any of the materials: Not answered.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive: Estimated.
7. Name and location of selected schools where course is being taught: Trial schools associated with program Science Centers in Africa.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: APSP currently has 8 program supported science educators in six African countries. Other program participants are available in Africa to work with local teachers in the trial use of materials.
2. Activities conducted for pre-service and in-service teacher training: Seminars and workshops are conducted periodically in most program countries to work with new materials and in general to acquaint teacher tutors, teachers and ministry of education officials with new teaching methods.
3. Available pre-service and in-service teaching material for science educators to use in preparing teachers: Effects of program materials and training efforts on classroom interaction patterns are currently being studied.

An unpublished document "Evaluation Programme" prepared by Dr. E.A. Yoloye of University of Ibadan, Nigeria, looks at some of the possible ways of evaluating non-cognitive learning in APSP.

S. PROJECT EVALUATION: Not answered.

T. PROJECT PUBLICITY: Not answered.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Teacher Training Workshop - Teacher Training College, Morogoro, Tanzania, February 1969; Materials Writing Workshop - Nairobi, Kenya, April 1969; African Advisors Meeting - Takoradi, Ghana, September 1969.

V. PLANS FOR THE FUTURE:

1. Meeting of Representative Committee of African countries to consider program continuation - Sierra Leone, February 1970.
2. Teacher Training Workshop - July 1970; site to be selected.
3. Continued printing of new trial materials for range of primary grades.

A. PROJECT TITLE: WEST AFRICAN EXAMINATIONS COUNCIL A-LEVEL CHEMISTRY SYLLABUS.

B. PROJECT DIRECTOR: R.E. Pearson, Dept. of Chemistry, Univ. of Ghana, Legon, Ghana; J.B. Redhead, Dept. of Chemistry, Univ. of Ibadan, Ibadan, Nigeria.

C. PROJECT HEADQUARTERS:
1. Contact: Either of the directors.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: None.

E. PROJECT SUPPORT:
1. Organizational agencies: West African Examinations Council (for development of syllabus); Ghana Association of Science Teachers; Science Teachers' Association of Nigeria.
2. Funding agency: Ministry of Education (for support of refresher courses).

F. PROJECT HISTORY:
1. Principal originators: West African Examinations Council and Ghana Association of Science Teachers.
2. Date and place of Initiation: April, 1964; Legon, Ghana.
3. Overall project purpose: To provide a modern A-level chemistry syllabus to replace the London A-level syllabus then in use in Anglophone West Africa.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: The present objective is to help teachers in increasing their effectiveness in teaching the new syllabus. Since teachers and students do not have ready access to materials which their counterparts in more affluent countries take for granted, a considerable amount of effort has been given to producing basic materials such as text and reference book evaluations, suitable experiments, equipment lists, and references to appropriate articles appearing in periodicals.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, Lectures.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Sixth-form chemistry (last two years of secondary school for those hoping to study science in a university).

K. MATERIALS PRODUCED:
1. Syllabuses for theory and laboratory work.
2. Specimen examinations.
3. Textbook evaluations.
4. Selected experiments (under revision).

5. Teachers' references from periodicals concerned with chemical education (discontinued).
6. Equipment list (under revision).
7. Final examinations (produced by WAEC).

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE:
Items 1 and 7 from West African Examinations Council, Headquarters Office, Private Post Bag, Accra, Ghana.
Item 1 is contained in the current Regulations and Syllabuses, costing about $0.60.
Item 7 costs about $0.30.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
1. Revision of K4, K6.
2. List of recommended chemicals.
3. Outline of complete program for laboratory work.
4. Specimen questions and problems.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 250 using the syllabus.
2. Number of students involved: 3500.
3. Number of schools involved: 150.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: All sixth-form schools in Nigeria, Ghana, and Sierra Leone.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Nothing available on formal basis.
2. Activities conducted for pre-service and in-service teacher training: Week-long refresher courses for chemistry teachers in sixth-form schools in Ghana are held yearly. The cost is about $1000 each, and is provided by the Ministry of Education. Outside lecturers have on occasion been provided by the British Council.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Nothing specifically provided.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: None.
4. Additional evaluative data available for interested individuals: None.

T. PROJECT PUBLICITY:
Joy Redhead, "The New West African A-Level Chemistry Syllabus", *Journal of the Science Teachers' Association of Nigeria*, Vol. 6, No. 3.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Two week-long refresher courses; continuation of revision of K4 and K6.

V. PLANS FOR THE FUTURE:
Production of complete equipment and chemical lists and a set of specimen problems and questions. Detailed revision of introductory experiments. Outline of possible laboratory program for two-year course. Three-week course for new teachers.

A. PROJECT TITLE: CENTER FOR THE STUDY OF SCIENCE TEACHING (C.E.S.E.C.).

B. PROJECT DIRECTOR: Dr. Alberto P. Maiztegui, Director of I.M.A.F. (Institute of Mathematics, Astronomy and Physics.). Ing. Rafael E. Ferreyra, Head of Science Teaching Section, (C.E.S.EC), I.M.A.F. University of Cordoba-Laprida 854-Cordoba, Argentina. Telephone: 22751.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Display of materials being tested or produced; lectures for visitors.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. Alberto Maiztegui, Prof. of Physics; Ing. Rafael Ferreyra, Prof. of Physics; Ing. Felix Mitnik and Ing. Jorge Schettini (Electrical and Mechanical Engineers); Lic. Carmen Peme de Aranega and Lic. Livio Grasso, Psychologists; Norberto Schintman, Biochemist; Carmen R. de Ferreyra, Elementary School Teacher.

E. PROJECT SUPPORT:
1. Organizational agency: IMAF-University of Cordoba.
2. Funding agencies: University of Cordoba - Special contracts for production or evaluation of teaching materials or for organizing courses for teachers with UNESCO, Pan American Union, Institute for Science Teaching Improvement, Ministry of Education, etc.

F. PROJECT HISTORY:
1. Principal originators: Dr. Alberto P. Maiztegui and Ing. Rafael E. Ferreyra.
2. Date and place of Initiation: September 1964; Cordoba, Argentina.
3. Overall project purpose: To contribute to science teaching improvement and to continue the UNESCO Pilot Project for Physics Teaching.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:
1. Evaluate the UNESCO Pilot Project materials and methods in Argentine secondary schools introducing modifications in the original materials if necessary.
2. Develop new methods and curricular materials for physics teaching and evaluate and adapt existing courses.
3. Create the proper conditions for research work and post graduate studies in science education at Cordoba University.
4. Offer opportunities to science teachers to participate in curriculum development, training courses, evaluation programs, etc.

5. Develop extra-curricular scientific activities for secondary school students.
6. Contribute to the development of new materials and methods for college courses and elementary schools.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, Programmed instruction, Laboratory investigations, Lectures, Seminars.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Physics; upper secondary school; age 15-18 years; all levels.

K. MATERIALS PRODUCED:

UNESCO Pilot Project Kits:

Unit 0 - Experiments and Graphs.
Unit 1 - Some Properties of Light.
Unit 2 - Difraction and Interference.
Unit 3 - Ripple Tank.

Electricity and Magnetism Kits:

Printed Materials:

1. Programmed texts, Physics of Light: Unit 0
   Unit 1
   Unit 3
   Magnetism: Unit 4
2. Teacher's Guides:
   (a) Ripple Tank.
   (b) UNESCO Pilot Project Film Loops together with written instructions for teachers.
   (c) Organization of Science Fairs and Clubs.
3. Selected topics for teachers.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE:

UNESCO Kits:

Unit 0 - $2.00
Unit 1 - $9.00
Unit 2 - $5.00
Unit 3 - $10.00

Printed Materials:

1. Programmed texts: Unit 0 - $1.20
   Unit 1 - $1.60
   Unit 3 - $1.60
   Unit 4 - $0.80
2. Teacher's Guides: (a) - $0.80
   (b) - $40.00
   (c) - $0.80
3. Electricity and Magnetism Kit: $9.00.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: English.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
1. Student set for experiments in mechanics.
2. Teacher's Guide for the Physics of Light course.
3. Integrated Science Course for grades 6-7.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: No one uses the entire course.
2. Number of students involved: More than 5,000 in Argentina and Bolivia.
3. Number of schools involved: More than 50.
4. Total number of teachers using any of the materials: More than 50.
5. Total number of students using any of the materials: More than 5,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Colegio Nacional de Monserrat-Escuela de Comercio Manuel Belgrano in Cordoba - Escuelas Normales de Mendoza, San Luis, No. 3 and No. 9 in Buenos Aires-Colegio Adventista del Plata in Puiggari, Entre Rios.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Technical assistance during the school year, including test construction, ideas for discussions, ideas for setting up laboratories, for implementation and administration of laboratory-oriented science courses, etc.
2. Activities conducted for pre-service and in-service teacher training: Academic-year training activities for teachers (laboratory skills, evaluation techniques, participation in development). Short seminars in different cities (financed by participants and the University). International seminars (financed by UNESCO on special request of Governments).
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: The course materials are used for this purpose.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff and UNESCO.
2. Pertinent published research studies: Studies have been conducted under contract with UNESCO.
3. Brief abstract of in-house or unpublished research: UNESCO Pilot Project materials have proved to be very effective

in introducing experiments in physics courses in areas where very few laboratories and few well trained teachers are available. Open ended home experiments and open questions designed to develop intellectual abilities and skills (comprehension, application, analysis, synthesis and evaluation) seem to be a very good complement for the programmed laboratory, when properly discussed by the students.

4. Additional evaluative data available to interested individuals: Can be obtained from Ing. Ferreyra, IMAF, Laprida 854, Cordoba, Argentina.

T. PROJECT PUBLICITY: Most of the Project Publicity was done by means of short seminars in different cities and during international seminars in Latin American countries.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

1. Articles will be submitted to professional journals (1970).
2. International workshop for developing Nuclear Science Materials will be held during 1970 (for secondary schools).
3. Development of an Integrated Science Course for grades 6-7-8 (1970).
4. New programmed laboratory texts and kits about electricity and electromagnetism will be started in 1970.

A. PROJECT TITLE: AUSTRALIAN ACADEMY OF SCIENCE SCHOOL BIOLOGY PROJECT.

B. PROJECT DIRECTOR: Mr. David G. Morgan, Australian Academy of Science School Biology Project, 191 Royal Parade, Parkville, Vic. 3052, Australia. Telephone: Melbourne 34-2573.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. D.G. Morgan, Supervising Editor; Miss E.D. Best, Dr. A.K. Lee, Mr. J.R. Nicholas, Dr. M.G. Pitman, Editors.

E. PROJECT SUPPORT: None.

F. PROJECT HISTORY:
1. Principal originators: Biology Standing Committees of the Victorian Universities and Schools Examinations Board and the Public Examinations Board of the University of Adelaide (South Australia).
2. Date and place of Initiation: 1964; Melbourne.
3. Overall project purpose: To adapt B.S.C.S. materials to suit a 2-year biology course for Australian 11th and 12th grade students.

G. PRESENT COMMERCIAL AFFILIATIONS: None. The Australian Academy of Science is its own publisher and distributor.

H. PROJECT OBJECTIVES: To prepare classroom materials for a 2-year senior high school biology course to suit Australian students. The programme differed from other courses used in Australia in that it has sought to emphasize the nature of science as inquiry, to encourage students to think and act in a scientific way. Detailed objectives are set out in the Teacher's Guide, page 6. Please consult these.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Biology; grades 11 and 12; ages 15-18; suited to average and above average high school students.

K. MATERIALS PRODUCED:
"Biological Science: The Web of Life" (Australian Academy of Science, Canberra, A.C.T.)
1. Textbook.
2. Student's Manual, Part 1.
3. Student's Manual, Part 2..

4. Teacher's Guide.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: Items available directly from Australian Academy of Science, Gordon Street, Canberra City, A.C.T. 2601, Australia. (Prices through booksellers are somewhat higher).
1. A$ 3.90.
2. A$ 1.10.
3. A$ 1.10.
4. A$ 2.20.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: New edition to be published in 1973.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 1500 (1969).
2. Number of students involved: 34,000 (1969).
3. Number of schools involved: 600 (1969).
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive within 5%.
5. Name and location of selected schools where the course is being taught: Majority of secondary schools in all Australian States except New South Wales.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: The project has part-time field officers available in Queensland, Victoria, Tasmania and South Australia for consultation on all aspects of course implementation.
2. Activities conducted for pre-service and in-service teacher training: Pre-service and in-service courses are conducted by appropriate bodies in the various states and not by this Project directly.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None available at present. BSCS materials broadly relevant and usable.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies:
   (a) Lucas, A.M., "The Effect of Teaching for Content-free Objectives in BSCS-type Biology", Australian Science Teachers Journal, v. 15, No. 1, 1969.

(b) Batten, H.S., "An Analysis of the Leaving Certificate Examination in Biology, 1967", VUSEB Circular to Schools, August, 1968.

(c) "An Analysis of the Leaving Certificate Examination in Biology, 1968", VUSEB Circular to Schools, March, 1969.

3. Brief abstract of in-house or unpublished research: None.

4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY:
Morgan, D.G., "Some Secondary Science Curriculum Developments in Australia", Bulletin: UNESCO Regional Office of Education in Asia, IV: 130-135, 1969.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:
Second Edition of all materials is to be planned during 1970 and prepared during 1971 for use in 1973.

A. PROJECT TITLE: INDIVIDUAL MATHEMATICS PROGRAMME (I.M.P.).

B. PROJECT DIRECTOR: M. L. Clark, Assistant to Director, Australian Council for Educational Research, 9 Frederick Street, Hawthorn, Victoria, 3122, Australia.
Melbourne 81-1271.

C. PROJECT HEADQUARTERS:
1. Contact: The Senior Advisory Officer, Australian Council for Educational Research, (address above).
2. Special facilities or activities available for visitor viewing: Permanent display at the project headquarters. Visitors should contact the Senior Advisory Officer. Review sets available on loan within Australia.

D. PRINCIPAL PROFESSIONAL STAFF: John F. Izard, Executive Officer; Mair Jagger, Research Assistant; Author panel comprising: John F. Izard, Don H. Goodger, Frank L. Smith, Brian D. Haig, Graham J. Whitehead, Beth M. Blackall. Consultants: S. S. Dunn, Professor of Education, Monash University; J. P. Keeves, Research Fellow, Australian National University; and Curriculum and Research Officers of all Australian State Education Departments.

E. PROJECT SUPPORT:
1. Organizational agencies: Australian Council for Educational Research, and State Education Departments.
2. Funding agencies: None.

F. PROJECT HISTORY:
1. Principal originator: Australian Council for Educational Research.
2. Date and place of Initiation: December, 1964; Melbourne.
3. Overall project purpose: To provide individual teaching materials to suit new mathematics curricula being implemented in all Australian states.

G. PRESENT COMMERCIAL AFFILIATIONS: Rigby Limited, Adelaide, South Australia, have published:
1. I.M.P. B for Grades 3 and 4.
2. I.M.P. C1 & C2 for Grades 5 and 6.
3. I.M.P. C3 for Grade 6+ is in press.

H. PROJECT OBJECTIVES: To develop text and assignment materials which permit individual progress through a modern mathematics program, based upon the outline of content which resulted from the Curriculum Officers' Conference at A.C.E.R., March 1964. All Australian states have courses of study bearing a close correspondence with this outline of content. To our knowledge, these materials are unique in providing an individual approach to mathematics which goes beyond computational skills, and which includes a comprehensive integrated testing program. Objectives are listed in I.M.P. Teacher's Handbooks.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Self-directed and teacher-directed assignments.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Elementary School Mathematics; I.M.P. A (Introductory Set) (beginning Grade 3 approx.); I.M.P. B (Grades 3 & 4 approx.); I.M.P. C (Grades 5, 6 and 7 approx.); one kit of materials is intended for a class of up to 40 children.

K. MATERIALS PRODUCED:

1. Set B for Grades 3 and 4 comprising: Placement Test, Number Booklets and Answer Cards, Worksheet Pads, Mastery Test Pads, Assignment Cards and Answer Cards, Record Charts, Transparent Grids, Plastic Building Pegs, Gummed Paper Shapes, Clockface Stamp, Glue, Colored Pencils, Teacher's Handbook.
2. Review set comprising sample items from No. 1 above.
3. Information Bulletin 2 - Individual Mathematics Programme (out of print).
4. Information Bulletin 3 - Individual Mathematics Programme - Some Notes on Kit B.
5. Information Bulletin 6 - Individual Mathematics Programme C.
6. Brochure (B) (out of print).
7. Brochure (C).
8. Set C1 & C2 for Grades 5 and 6 comprising: Starter Booklets and Answer Cards, Assignment Booklets and Answer Cards for these topics - Whole Numbers (5 different Booklets), Place Value (2 different booklets), Fractions (6 different booklets), Length (3 different booklets), Money (2 different booklets), Decimals (3 different booklets), Spatial Knowledge (2 different booklets), Area (2 different booklets), Capacity, Time, Weight, Graphs and Volume (each 1 booklet). All these non-expendable assignment and starter booklets are provided in multiple copies. Test Cards, Test Record Book (includes test items and record charts, and glossary of mathematical terms and symbols), Test Score Cards, Worksheet Pads, Transparent Grids, Plastic Building Pegs, Abacus Stamp, Index Cards, Teacher's Handbook C1 & C2.
9. Review set comprising sample items from No. 8 above.
10. I.M.P. Test Record Book C1 & C2 - required by each child using the set.
11. Set C3 for Grades 6 and 7 comprising Assignment Booklets and Answer Cards extending each topic met in C1 and C2 and adding further topics including Metric, Statistics, Sets, Pattern, Additional, and Enrichment, Test Record Book C3, Test Score Cards, Teacher's Handbook C3. I.M.P. C3 is intended to be added to the scheme for children who have completed I.M.P. C1 & C2.
12. Review set comprising sample items from No. 11 above.

13. I.M.P. Test Record Book C3 - required by each child using the set.
14. Price lists of I.M.P. materials available, including expendable items and reusable material replacements.

L. MATERIALS AVAILABLE FREE: Items 4, 5, 7, and 14 from Australian Council for Educational Research, 9 Frederick Street, Hawthorn, Victoria, 3122, Australia.

M. MATERIALS PURCHASABLE:
Item 1, $60 (Australian currency) net. per set, available from Australian Council for Educational Research or from the publishers - Rigby Limited, Adelaide, South Australia. Cost does not include freight outside Australia (45 lb wt.).
Item 2, $5 (Australian currency) net. per set, available from Australian Council for Educational Research only. Cost does not include freight outside Australia (1¼ lb wt.).
Item 8, $40 (Australian currency) net. per set, available from Australian Council for Educational Research or from the publishers - Rigby Limited, Adelaide, South Australia. Cost does not include freight outside Australia (20 lb wt.).
Item 9, $5 (Australian currency) net. per set, available from Australian Council for Educational Research only. Cost does not include freight outside Australia (1 lb wt.).
Item 10, 20 cents per copy, freight extra outside Australia.
Item 11, $40 (Australian currency) net. per set, available from Australian Council for Educational Research or from the publishers - Rigby Limited, Adelaide, South Australia. Cost does not include freight outside Australia.
Item 12, $5 (Australian currency) net. per set, available from Australian Council for Educational Research only. Cost does not include freight outside Australia.
Item 13, 20 cents per copy, freight extra outside Australia.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: I.M.P. A (Introductory set for beginning Grade 3 approx.) is being prepared for trial during 1970.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: Cannot be determined. Over 4,000 classroom kits of Set B and about 2,000 classroom kits of Set C have been purchased in the period June-December 1969.
2. Number of students involved: Cannot be determined.
3. Number of schools involved: Cannot be determined.
4. Total number of teachers using any of the materials: Cannot be determined.

5. Total number of students using any of the materials: Cannot be determined.

6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? The number of kits shown in 1 are definitive.

7. Name and location of selected schools where the course is being taught: Kingsbury Primary School, Fawkner North Primary School, Parklands Primary School, all in Victoria, Australia. Darra Primary School, Graceville Primary School, Queensland, Australia. Scotch College Junior School, Prince Alfred College Preparatory School, South Australia, Australia. Shawnee Mission Elementary Public Schools, Kansas, U. S. A.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: The Senior Advisory Officer has a permanent display at the project headquarters. Within Australia, review sets are available on loan from A. C. E. R. Teachers using the materials are able to write or telephone the Advisory Services Department for advice. (This service is in addition to State Education Department Programs.)

2. Activities conducted for pre-service and in-service teacher training: In-service Seminar comprising lecture, workshop groups, and questionnaire. Content includes discussion of new mathematics curricula, place of structured aids and printed assignments, discussion of Set B and/or Set C; groups then work through materials of the scheme. Duration of seminar is dependent upon time available - ranges from 3 hours to 7 hours. Seminars held to date have been financed by the Australian Council for Educational Research. Assistance has been received from a State Institute for Educational Research, State Curriculum and Research Branches, the publisher of I. M. P., and educational aids suppliers. Seminars have been held in schools, teachers' colleges, and in the A. C. E. R. offices. Participants generally pay for their own meals and travelling expenses. Many seminars are held outside school time (evenings, Saturdays, and vacations).

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: No materials specially published for these purposes, but see R, 1 and 2 above.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies: None published.

3. Brief abstract of in-house or unpublished research: Research evidence of objectives achieved: A follow-up study of Set B was mentioned in the 1967 Clearinghouse Report. Availability of evidence: Copies of the report of the follow-up study are held by the Project Staff and the University of Melbourne Faculty of Education.

4. Additional evaluative data available to interested individuals: Additional evaluative data is available to visitors to the project from the Executive Officer but is severely limited due to lack of funding.

T. PROJECT PUBLICITY:

1. "Individualized Instruction in Arithmetic (winning entry for G. S. Browne prize for educational practice, 1963), J. F. Izard, Victorian Institute for Educational Research Bulletin No. 10, 1-16, May 1964.
2. "An Individual Approach to the Teaching of Mathematics", J. F. Izard, Tasmanian Teacher, 17, 16-18, December 1966; Education (N. S. W.), 47, 163, November 16, 1966; Digest of Modern Teaching, pp. 57-60, 1967; Queensland Teachers Journal, 72, 126-8, May 1967; South Australian Teachers Journal, 18, 11-15, February 1967; Western Australian Teachers Journal, 57, 87-9, April 1967.
3. "Individual Mathematics Programme", R. D. Phillips, Education Gazette (New South Wales), 61, 59-61, January 1967.
4. "The Primary School and Mathematics: Some Trends and Issues", J. F. Izard, Chronicle of Australian Education, pp. 6-8, Vol. 2, No. 1, August 1969.
5. "New Learning Materials for Mathematics", J. F. Izard, Chronicle of Australian Education, pp. 66-68, Vol. 2, No. 2, October 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Set C1, C2, and C3 materials were given wider trial. Set C1 & C2 was later published (May 1969). Set C3 materials are in press. An Information Bulletin (see K.5 above) was published. Some units for I. M. P. A (Introductory set for beginning Grade 3 approx.) were given initial trial and revised for wider trial during 1970. Work has commenced on a second edition of Set B.

V. PLANS FOR THE FUTURE: 1970: Publication of I. M. P. C3; Completion of I. M. P. A trial units; Publication of I. M. P. A (Introductory set for beginning Grade 3).
1970/1971: Publication of I. M. P. B (second edition).

A. PROJECT TITLE: JUNIOR SECONDARY SCIENCE PROJECT (JSSP).

B. PROJECT DIRECTOR: Dr. W.C. Radford, Director, Australian Council for Educational Research, Frederick Street, Hawthorn, Australia 3122.

C. PROJECT HEADQUARTERS:

1. Contact: Project director
2. Special facilities or activities available for visitor viewing: Published materials can be inspected at the offices of the Australian Council for Educational Research.

D. PRINCIPAL PROFESSIONAL STAFF: Project has been completed.

E. PROJECT SUPPORT:

1. Organizational agencies: Not answered.
2. Funding agencies: Not answered.

F. PROJECT HISTORY:

1. Principal originators: The Science Standing Committee of the Victorian Schools and Universities Examinations Board in conjunction with the Australian Council for Educational Research.
2. Date and place of Initiation: February 1966; Hawthorn, Victoria.
3. Overall project purpose: To prepare science learning materials for use in the first four years (grades 7-10) of Victorian secondary schools. (Materials for grades 7-8 only were prepared)

G. PRESENT COMMERCIAL AFFILIATIONS: F.W. Cheshire Publishing Pty. Ltd., 346 St. Kilda Road, Melbourne 3004, for all published materials.

H. PROJECT OBJECTIVES: Broad objectives are stated in the JSSP General Information booklet. Detailed objectives are given in the Teacher's Guide to each unit. The learning materials consist of card systems with accompanying teachers' guides and are designed to enable individual rate of student progress. Laboratory investigation and experience is an integral part of each learning sequence. An inquiry approach is generally used.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science, embracing aspects of chemistry, physics, biology, geology and astronomy; grades 7-8; ages approximately 11-13 years.

K. MATERIALS PRODUCED: The work for each year is divided into units. Each unit consists of a card sequence with optional and remedial branches, terminating in a comprehensive test. A teacher's guide folder accompanies each unit. Each unit is tried in the classroom, revised, re-tried and revised a second time prior to publication. All units have been published.

Green Series

Unit 1: Intoduction. An introduction in card form, to the use of the card learning sequence, with some introduction to the nature of science and to common laboratory equipment.

Unit 2: The Sky Throughout the Year. Observation of the sun, moon and southern stars and specification of position by measurement of elevation and azimuth. Some interpretation of the data obtained.

Unit 3: Materials of the Universe. This unit leads students through activities with solids, liquids and gases to a particle model of matter.

Unit 4: When Substances are Mixed. An introduction to chemical change through the study of certain non-reacting mixtures, solutions and reacting mixtures.

Unit 5: How Hot Is It? An introduction to temperature and various thermometric properties. Construction and use of a thermometric scale.

Unit 6: Energy for Life. An examination of the products of respiration leading to the idea of the release of energy from food during respiration in living things.

Unit 7: The Changing Earth. An introduction to the processes affecting topography, including weathering, erosion and sedimentation. Some features of sedimentary rocks.

Unit 8: Food for Living Things. An historical account of the discovery of the role of photosynthesis and a brief comparison between animal and plant modes of nutrition.

Unit 9: Places and Things. A study of a biological community to bring out some of the factors determining its structure and some factors influencing changes that may take place.

Red Series

Unit 1: Earth's Neighbours in Space. Observation of phases, surface features and movements of the moon. Recognition of the Zodiac constellations and some major stars.

Unit 2: Looking for Patterns. An introduction to the use of keys through observation of vertebrates and invertebrates. Some consideration of the interaction of plants and invertebrates in their natural surroundings.

Unit 3: When Substances are Heated. Investigation of chemical changes during decomposition and oxidation. Experimental comparison of ignition temperatures of four substances.

Unit 4: Forces and Interactions. Study of the interactions of objects in electric, magnetic and gravitional force fields. Introduction of charged particles.

Unit 5: Compounds in Solution. Distinction between acidic, alkaline and neutral solutions by the use of indicators with explanations in terms of pH.

Unit 6: Work and Energy. This unit deals principally with thermal, kinetic and gravitational potential energies and work. It introduces chemical and electrical energies and energy transformations.

Unit 7: How Mammals Function. Consideration of the structure - function relationship in mammals and flowering plants. The major part of the unit deals with the way in which the higher organisms obtain energy.

Unit 8: The Surface of the Earth. The relationship between land surface features and underlying geological structures. Features of sedimentary, igneous and metamorphic rocks.

Unit 9: How Does it Sound? Distinction between loudness, duration, pitch and quality and investigation of their physical causes. Introduction to resonance and overtones.

L. MATERIALS AVAILABLE FREE: Booklet "JSSP General Information" available from Cheshires or Australian Council for Educational Research.

M. MATERIALS PURCHASABLE:
All published materials. Teacher's guide folders may be purchased separately ($3, Aust., each). Class sets contain material for a class of 40 students and cost in the vicinity of $50-$60 (Aust.) for each unit. Requests should be addressed to the Sales Division, Australian Council for Educational Research, Frederick Street, Hawthorn, Victoria, 3122, Australia. Payment should accompany all orders.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course? 600.
2. Number of students involved: 20,000.
3. Number of schools involved: 200.
4. Total number of teachers using any of the materials: Unknown.
5. Total number of students using any of the materials: Unknown.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Not answered.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: None.
2. Activities conducted for pre-service and in-service teacher training: None.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION: An independent committee was set up to investigate the use of the Green Series (Grade 7) materials and to seek teacher and student opinion on their effectiveness. A limited number of copies of their report is available.

T. PROJECT PUBLICITY:
Three Newsletters were published. Copies of some of these may be available from the publisher - F.W. Cheshire Publishing Pty. Ltd.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: The writing and classroom trial of the Green Series (Grade 7) and Red Series (Grade 8) units were completed during 1968-1969.

V. PLANS FOR THE FUTURE:
The project has been terminated.

A. PROJECT TITLE: NATIONAL SCIENCE CURRICULUM MATERIALS PROJECT (N.S.C.M.).

B. PROJECT DIRECTOR: Mr. R.T. Slattery, Director, N.S.C.M. Project, 2/32 Church Street, Ryde, 2112, N.S.W., Australia. Telephone: 80 5282.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Inspection of N.S.C.M. trial material; discussions with N.S.C.M. staff and editorial consultants; use of C.D.L.M. Curriculum Resources Library; visits to schools using N.S.C.M. materials on a trial basis.

D. PRINCIPAL PROFESSIONAL STAFF: Full time: Ruth Hamilton, Editorial Assistant. Part time: Dr. David Cohen, Dr. G.R. Meyer, Prof. D. Allbrook, F.T. Barrell, G.A. Blaxell, J.M. Mayfield, Rev. Bro. K.S. McDonnell, J.G. Scott, Editorial Consultants.

E. PROJECT SUPPORT:
1. Organizational agency: Centre for the Development of Learning Materials (C.D.L.M.).
2. Funding agencies: At present Jacaranda Press Pty. Ltd. Application for research monies under consideration.

F. PROJECT HISTORY:
1. Principal originators: Dr. G.R. Meyer (Chairman) and editorial consultant.
2. Date and place of Initiation: March, 1968; Sydney, Australia.
3. Overall project purpose: The principal purpose of the N.S.C.M. Project is to produce a comprehensive set of interrelated science materials for senior science programmes already established in the six Australian states. It does however try to influence the way these courses are taught and to broaden the objectives of science teaching at this level.

G. PRESENT COMMERCIAL AFFILIATIONS: None, but are dependent on research monies. At present all trial materials distributed by C.D.L.M.

H. PROJECT OBJECTIVES:
1. The N.S.C.M. Project seeks to show the creative processes of science. Materials incorporate examples and anecdotes which show the qualities of science: the value of evidence in reaching conclusions; the development of knowledge through a series of stages; open-mindedness of approach in respect to the current state of knowledge; critical and sceptical attitudes where appropriate; respect for the tentativeness of the findings of science; evidence of abortive experiments;

and the use of instruments in extending the senses. The N.S.C.M. Project shows scientists as people. Where possible, examples of Australian scientists, working right at the frontier of knowledge, are used. The project tries to associate the science taught in schools with personal, community, national and international problems rather than teaching science for its own sake. The materials provide opportunities for pupils to use imagination and inventiveness and to seek evidence from practical work and from excursions away from the school. Students are also encouraged to communicate to others their understandings, feelings and skills in science. The materials are designed to provide opportunities for pupils to write and talk about science. Cognizance has been taken of important science curriculum projects which have significantly influenced senior science teaching in Australia (The Physical Science Study Committee (PSSC); The Chemistry Educ. Materials Study (CHEMS); The Biological Science Curriculum Study (BSCS); The Earth Science Curriculum Project (ESCP); The Harvard Project Physics (HPP); and the Nuffield Science Teaching Projects); all have contributed greatly to the statement of sound science teaching objectives. The N.S.C.M. Project has attempted to re-think these objectives within the terms of reference of an Australian environment.

2. A statement of the objectives of the Project has been made in both N.S.C.M. bulletins which have been distributed to all high schools throughout Australia and New Zealand. Ultimately the teachers' manuals will contain an introduction which will contain a discussion of N.S.C.M. objectives.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups, Multi-media approach, Self-evaluation, and Field investigations.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Physics, chemistry, biology, geology; final two years of Australian high school (grades 11 & 12); average age 16-18 years; full range of abilities for Australian students at these grades.

K. MATERIALS PRODUCED: N.S.C.M. Project materials utilize a modular design. A module consists of the core booklet, practical work and evaluation materials and associated audiovisuals. Teachers' manuals will be prepared for each of the four subject areas. Listed below are the core booklets of the modules already projected for completion to trial form by December 1970.

Physics:
1. P 1: Space, Matter and Time.
2. P 2: Descriptive Study of Motion (Kinematics).
3. P 3: Action Forces on Bodies.
4. P 4: Energy and Momentum.

5. P 5: Rotational Motion.
6. P 6: Fluid States and Dynamics.
7. P 8: Sound Waves.
8. P 9: Heat Energy: Kinetic Theory.
9. P11: Current Electricity.
10. P13: Magnetism (Magnetic Pole Concept).
11. P14: Alternating Current.
12. P15: Electronics.
13. P16: Electronic Devices in Communication.
14. P20: Relativity.
15. P21: Astronomy.
16. P24: The Solid State.

Chemistry:
1. C 2: Chemical Bonding.
2. C 3: Chemical Lattices.
3. C 4: Chemical Equations.
4. C 6: Chemical Periodicity Vol. 1 (Theory).
5. C 7: Chemical Periodicity Vol. II (Application).
6. C 9: Rates of Chemical Reactions.
7. C10: Principles of Chemical Equilibrium.
8. C11: Oxidation and Reduction.
9. C12: Acids and Bases.
10. C13: The Chemistry of Carbon Compounds Vol. 1 (Structural).

Biology:
1. B 1: The Invertebrates.
2. B 6: Spread of Living Things on Land.
3. B 8: History of Living Things.
4. B 9: How Evolution Works.
5. B10: Population Ecology.
6. B16: Mendelian Genetics.
7. B17: Modern Genetics.
8. B19: Origin of Man I.
9. B20: Origin of Man II.
10. B21: Animal Behavior.
11. B23: The Parasitic Way of Life.

Geology:
1. G 2: Minerals.
2. G 6: Shaping the Earth's Surface.
3. G 7: Sedimentary Rocks.
4. G 9: Structural Geology and Mapping.
5. G10: Coal and Petroleum.
6. G12: Earthquakes and the Interior of the Earth.
7. G13: Fossils.
8. G14: Geological Time.
9. G18: The Geology and Landscape of Queensland.
10. G19: The Geology and Landscape of New South Wales.
11. G21: The Geology and Landscape of Tasmania.
12. G22: The Geology and Landscape of South Australia and the Northern Territory.

Source Books:
1. S 1: Scientific Attitude.
2. S 4: Frontiers of Science - Science Case Studies.
3. S 9: N.S.C.M. Glossary.

L. MATERIALS AVAILABLE FREE:
1. Modules supplied free to schools selected for the try out of materials.
2. A sample set of materials available on application to the Director.
3. N.S.C.M. bulletins available free. Apply to the Director for placement on mailing list.

M. MATERIALS PURCHASABLE: Contact project headquarters.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

Physics:
1. P 7: Wave Motion (in Elastic Media).
2. P10: Electrostatics.
3. P12: Electro Magnetism.
4. P17: Light Waves.
5. P18: Quantum Physics.
6. P19: The Atom Nucleus in Physics.
7. P22: The Physics of Meteorology.
8. P23: Atmospheric Electricity.
9. P25: Waves in Nature.

Chemistry:
1. C 1: The Atom in Chemistry.
2. C 5: Pure Substances and Mixtures.
3. C 8: Energy in Chemical Reactions.
4. C14: The Chemistry of Carbon Compounds Vol. II (Systematic).

Biology:
1. B 2: Vertebrate Animals.
2. B 3: The Plant Kingdom.
3. B 4: Microorganisms.
4. B 5: Life in Water.
5. B11: Cells and Tissues.
6. B22: Man and Environment - Conservation of Natural Resources.

Geology:
1. G 1: Crystals.
2. G 3: Igneous Rocks.
3. G 4: Weathering and Soils.

4. G 5: Surface and Subsurface Water.
5. G 8: Metamorphic Rocks.
6. G11: Wealth from the Earth.
7. G15: The Ocean Basin.
8. G16: The Geological Structure of Australia.
9. G20: The Geology and Landscape of Victoria.
10. G23: The Geology and Landscape of Western Australia.

Source Books:
1. S 2: Branches of Science.
2. S 3: Processes of Science.
3. S 7: Observational Guides - Biology.
4. S 8: Observational Guides - Geology.

Additional modules will be produced in response to changing Australian senior science curricula.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Not applicable as N.S.C.M. Project does not offer 'courses' as such. Courses can be constructed from the modules but at this stage it is an erroneous concept to speak of 'adopting entire courses'. For try outs, at least 30 teachers will use each module. The same 30 teachers will not use all modules, the number they use depending on:
   (a) the module's suitability for use with their existing materials.
   (b) the particular courses of study offered.

Because of the way Australian science courses are constructed it is possible for a student to be studying up to four science subjects in the one year. He may have four different teachers for these. Thus it is impossible to state the number of teachers using one or more modules with a class. These facts should be kept in mind when interpreting a response to questions 2 through 6.

2. Number of students involved: 1,000 per module.
3. Number of schools involved: 30 per module.
4. Total number of teachers using any of the materials: See 1.
5. Total number of students using any of the materials: See 1.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Representative private and governmental schools in Australia and New Zealand. Further information available through project headquarters.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Staff at project headquarters and editorial consultants offer guidance and leadership through regular workshops.

2. Activities conducted for pre-service and in-service teacher training: Regular workshops conducted in each State, approximate cost, $2,000 per workshop; secondary teachers involved in constructing parts of each module; Newsletter and other publications - approximate cost $750 per annum.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Four Teachers' manuals, one per subject area; teaching training films under consideration with approximate cost to be determined.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies:
Rev. Bro. K.S. McDonnell, "Australian Geology Courses Today: A Comparative Analysis", Australian Science Teacher Journal - May 1969.
3. Brief abstract of in-house or unpublished research:
(a) Content and objective of current Australian science curriculum.
(b) Research on design and layout of materials for senior science teaching in Australia.
4. Additional evaluative data available to interested individuals: Inquire at project headquarters.

T. PROJECT PUBLICITY:
1. 'Australian Geology Courses Today: A Comparative Analysis' by Rev. Bro. K.S. McDonnell.
2. D.W. Thorpe, Educational Books and Equipment, Melbourne, February 1970.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:
1. Four N.S.C.M. workshops during 1970 to produce parts of modules.
2. Six Editorial Consultants' conferences per year.
3. Publication schedule not available at this stage.

A. PROJECT TITLE: THE SCIENCE FOUNDATION FOR PHYSICS NEW INTEGRATED AND COORDINATED SCIENCE TEXTBOOK PROJECT FOR THE NEW SOUTH WALES SIX YEAR SCIENCE COURSES.

B. PROJECT DIRECTOR: Professor Harry Messel, Head of the School of Physics and Director of the Science Foundation for Physics within the University of Sydney, Sydney, N. S. W., Australia. 660-0522, Ext. 2537.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Through the N. S. W. Department of Education.

D. PRINCIPAL PROFESSIONAL STAFF: Professor Harry Messel (Director); Mr. E. N. Barker, Coordinating Editor, plus thirty two editors and authors including Professor S. T. Butler and Mr. H. K. Carey (Physics); Professors F. V. Mercer and L. C. Birch (Biology); Professors G. A. Barclay and D. P. Mellor (Chemistry); Professor A. H. Voisey and Dr. C. V. G. Phipps (Geology).

E. PROJECT SUPPORT:
1. Organizational agencies: University of Sydney; Science Foundation for Physics within the University of Sydney and the N. S. W. Department of Education.
2. Funding agencies: Science Foundation for Physics within the University of Sydney.

F. PROJECT HISTORY:
1. Principal originator: Professor Harry Messel.
2. Date and place of Initiation: 1962; New South Wales Department of Education and the University of Sydney.
3. Overall project purpose: Provision of texts and materials for the newly set six year integrated and coordinated science courses in the State of New South Wales, Australia.

G. PRESENT COMMERCIAL AFFILIATIONS: In Australia: The New South Wales Government Printer; Overseas: Pergamon Press Ltd., Oxford, England.

H. PROJECT OBJECTIVES: To produce materials and textbooks covering the new integrated four year secondary school science courses instituted in the State of New South Wales in 1962 and which are compulsory for all secondary school pupils. Also to produce materials and textbooks covering the coordinated science courses for the remaining two senior years of the secondary school course. This was the first time that a program embracing the whole of the six years secondary school science has ever been attempted in an integrated and coordinated fashion. The objectives of the course are set out in the introductions of the textbooks produced and in the general article by

H. Messel "A Look at The New Integrated and Co-ordinated Science Courses in N. S. W. and The Science Foundation for Physics Textbook Series" which discusses the project as a whole.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, Lectures, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Integrated Science covering the fields of physics, chemistry, biology, geology and astronomy for Forms I, II, III and IV (ages 12, 13, 14 and 15) at Modified, Ordinary Credit and Advanced Level. Co-ordinated Science covering the fields of physics, chemistry, biology and geology separately for ages 16 and 17 from ordinary to essentially advanced level.

K. MATERIALS PRODUCED:

1. Science for High School Students - SHS (in single and two volume format, revised in January, 1970).
2. Science for High School Students Teachers' Manual (revised January 1970).
3. Abridged Science for High School Students - ASHS (in two volume format and currently being revised). Also a British adaptation by Pergamon appearing in 13 small volume format appeared in 1969.
4. Senior Science for High School Students - SS Part 1: Physics.
5. Senior Science for High School Students - SS Part 2: Chemistry.
6. Senior Science for High School Students - SS Part 3: Biology.
7. Senior Science for High School Students Teachers' Manual.

L. MATERIALS AVAILABLE FREE: The general article by H. Messel: "A Look at the New Integrated and Co-ordinated Science Courses in N. S. W. and The Science Foundation for Physics Textbook Series" from Professor H. Messel, University of Sydney.

M. MATERIALS PURCHASABLE: Obtainable from: The N.S.W. Government Printer, Box 4050 G.P.O., Sydney, N.S.W. 2001, Australia

	$A Price per copy
1. Single-volume edition	8.00, plus .44 postage
Two-volume edition, Vol. I	4.20, plus .28 postage
Two-volume edition, Vol. II	4.20, plus .24 postage
2.	5.00, plus .20 postage

	$A Price per copy
3. Volume I	3.00, plus .16 postage
Volume II	3.00, plus .20 postage
4.	3.30, plus .16 postage
5.	3.30, plus .16 postage
6.	3.30, plus .12 postage
7.	6.00, plus .16 postage

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: German, French, Spanish, Russian.

P. ADDITIONAL MATERIALS BEING DEVELOPED: At present (1970) after seven years, the courses are, or have been, revised and new materials are being produced to cover these. This is a very large undertaking.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: About 1,000.
2. Number of students involved: At least 30,000 to 40,000.
3. Number of schools involved: 350.
4. Total number of teachers using any of the materials: About 1500.
5. Total number of students using any of the materials: 100,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: No special schools selected. Decision on use of books for course up to each school and science teacher. (The books are also used in some overseas centres, particularly in the United Kingdom where a specially adapted version has been published by Pergamon Press)

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Service available direct from the N.S.W. Department of Education.
2. Activities conducted for pre-service and in-service teacher training: Teacher training and financing is handled directly by the N.S.W. Department of Education but often the help of the concerned university departments, is enlisted.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by Department of Education in N.S.W.
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished research: The N.S.W. Department of Education each year evaluates the examinations and produces an internal report.
4. Additional evaluative data available to interested individuals: Yes, considerable data may be obtained by writing to: The New South Wales Director for Secondary Science Education, Department of Education, Bridge Street, Sydney, 2000 Australia.

T. PROJECT PUBLICITY: Project reviews in:

1. Nature Magazine, June 20, 1964.
2. The Australian Science Teachers' Journal, May, 1964.
3. P.O.A. Chronicle, Melbourne, 1964.
4. The Adelaide Advocate, May 16, 1964.
5. The Sydney Morning Herald, June 8, 1963.
6. Journal of New South Wales Teachers' Federation, June, 1963.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: At present a major revision of the six year science courses is taking place. The integrated four year science course was revised for 1969 and revised textbooks covering these were produced for 1970. The final two year senior science courses will be revised during 1970-72.

V. PLANS FOR THE FUTURE: Abridged Science for High School Students will be revised during 1970 and be out for 1971. Commencing 1971 it is intended to commence revision of the senior textbooks. No phase out of the work is envisaged. Amendment and revision will be on a continuing basis as experience from teachers and pupils requires.

A. PROJECT TITLE: TECHNICAL SCHOOL SCIENCE.

B. PROJECT DIRECTOR: Mr. G. Maclean, Technical Inspector, Technical Board of Inspectors, Education Department of Victoria, Treasury Place, Melbourne 3002, Australia. Tel. 63-0321, Ext. 451.

C. PROJECT HEADQUARTERS:
1. Contact: Executive Officer, Technical Schools Sciences Standing Committee, Curriculum and Research Branch, State Office's Annexe, 107 Russell Street, Melbourne 3000, Australia. Tel. 632331, Ext. 318.
2. Special facilities or activities available for visitor viewing: Visitors are welcome to discuss operations of the project with Executive Officer and members of the committee. Visits to schools can be arranged.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. G. Maclean, Inspector in Charge; Mr. R.W. Grose, Executive Officer.

E. PROJECT SUPPORT:
1. Organizational agency: Curriculum and Research Branch, Education Department of Victoria.
2. Funding agencies: Personnel and employees of Education Department of Victoria.

F. PROJECT HISTORY:
1. Principal originators: Mr. R.A. Armitage and a committee including Mr. J. Thomas and Dr. D. Cohen.
2. Date and place of Initiation: 1958; Melbourne.
3. Overall project purpose: To develop general science courses in Technical Schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Development of general science syllabuses and continuous review of products. Improvement of quality of science teaching. Close liaison with practicing teachers. Consultative services for teachers.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: General science; courses are intended to be mainly practical at individual or group level; grade 7 - 11. Chemistry, biology, technical science, physics; grade 11.

K. MATERIALS PRODUCED:
Syllabuses:

1. Form 1, Science (JUN 711), 1969 revision.
2. Form 2, Science (JUN 712), 1969 revision.
3. Form 3, Science (JUN 713), 1969 revision.
4. Form 4, Science 1, 1965.
5. Form 4, Science 11, 1965.
6. Syllabuses in Biology, Physics, Chemistry

Technician Science A and General Science have been produced and will be revised or rewritten over the next five years (see V, below)

L. MATERIALS AVAILABLE FREE: All items in K.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Units in specific areas for particular levels are under consideration (e.g. in biology)

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Approximately 800.
2. Number of students involved: 50,000.
3. Number of schools involved: 100.
4. Total number of teachers using any of the materials: 800-900.
5. Total number of students using any of the materials: Approximately 50,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Preston Institute of Technology, Preston; Burrwood Technical School, Burrwood; Jordanville Technical School, Ashwood; Ringwood Technical School, Ringwood; all in Victoria.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: The resources of the Curriculum and Research Branch are available to teachers on request. Visits to schools by members of the Board of Inspectors and members of the Standing Committee provide consultative service.
2. Activities conducted for pre-service and in-service teacher training: Departmental training conferences are organized in regions throughout the state. Regional committees operate in some areas. The Science Teachers' Association of Victoria organizes regular workshops, conferences, lectures, seminars for science teachers. Regional branches of this

organization service country areas.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: As in K.

S. PROJECT EVALUATION: None. Evaluation at this stage has been mainly by direct feedback from teachers and members of the standing committee.

T. PROJECT PUBLICITY:
None.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:
A complete re-examination of role of science in technical schools leading probably to a complete rewrite of syllabuses.

A. PROJECT TITLE: "BIOLOGIA NORDESTE" - A BRAZILIAN CURRICULUM PROPOSED FOR THE NORTHEAST.

B. PROJECT DIRECTOR: Prof. Oswaldo Frota Pessoa, Department of Biology, University of Sao Paulo, Sao Paulo, Brazil.

C. PROJECT HEADQUARTERS:
1. Contact: Prof. Aymar Soriano de Oliveira - CECINE - Cidade Universitaria - Recife, Pernambuco, Brazil.
2. Special facilities or activities available for visitor viewing: There is a book named "Biologia Nordeste" which is finished. There is also a course for leaders who will be responsible for the publicity of this project. This course is taking place at the CECINE. On the last two weeks of February there will be other courses in the other states of the Northeast. In order to evaluate this project there will be an experimental class in the public schools.

D. PRINCIPAL PROFESSIONAL STAFF: Biology Sector of the CECINE - Prof. Maria Jose de A. Lima, Coordinator; Prof. Aluizio B. Coutinho, scientific guide; Prof. Andre F. Furtado, Prof. Dardano de A. Lima, Prof. Seuza M. Pereira, Prof. Elizabeth A. Mansur, Collaborators.

E. PROJECT SUPPORT:
1. Organizational agencies: CECINE - Centro de Ensino de Ciencias do Nordeste.
2. Funding agencies: SUDENE - Superintendencia de Desenvolvimento do Nordeste.

F. PROJECT HISTORY:
1. Principal originator: Not answered.
2. Date and place of Initiation: March, 1969; CECINE, Cidade, Universitaria Recife, Pernambuco, Brazil.
3. Overall project purpose: The unification of the biology curriculum for teachers and students of high school in the Brazilian Northeast.

G. PRESENT COMMERCIAL AFFILIATIONS: The book was printed by the Universitarian Printing Press.

H. PROJECT OBJECTIVES: The main objective of our project is to improve the biology curriculum in the Northeast high school level. We thought that the best way to reach it was by preparing a biology text book which put emphasis on the biological problems of the Brazilian Northeast. We named this book "Biologia Nordeste".

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Programmed instruction, Laboratory investigations, Lectures, Seminars, Discussion groups, Problem method.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: High school students; ages 15 - 18.

K. MATERIALS PRODUCED:
1. Text book - "Biologia Nordeste".
2. Teachers guide.
3. A kit of Histology.
4. Additional Readings: "O Tempo e o Clima do Nordeste" and "Ecologia do Nordeste".

L. MATERIALS AVAILABLE FREE: All the materials of letter K. From project headquarters.

M. MATERIALS PURCHASABLE: The text book "Biologia Nordeste" - $5.00; additional readings: "O Tempo e o Clima do Nordeste" - $1.50; "Ecologia do Nordeste" - $2.50.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Portuguese.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: The materials could be translated into any language; contact project for further information.

P. ADDITIONAL MATERIALS BEING DEVELOPED: The additional reading: "Ecologia do Nordeste".

Q. PROJECT IMPLEMENTATION: Project has not been implemented. 140 teachers are presently being trained. Courses will begin in March 1970.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Biology sector - CECINE; Biology Sector of other establishments of the CECINE in the states of: Sergipe, Alagoas, Rio Grande do Norte, Paraiba, Ceara, Maranhao e Piaui; Department of Ecology - Instituto de Biociencias, UFPe.
2. Activities conducted for pre-service and in-service teacher training: A course for leaders - 3 weeks; a course for high school teachers of each northeast state - 3 weeks; a training course of 3 months; a training course of 9 months.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: All the materials and teachers training activities are available for any science teacher. Cost is listed in question M.

S. PROJECT EVALUATION: Evaluation will follow project implementation in March 1970.

T. PROJECT PUBLICITY: None yet.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: 1967/ 1968 - Researches on text books of biology used in the Northeast high schools; 1969 - Choice of the project "Biologia Nordeste", delineation of objectives text preparation; 1970 - Conclusion.

V. PLANS FOR THE FUTURE: Project implementation and evaluation.

A. PROJECT TITLE: GRUPO DE ESTUDOS DO ENSINO DA MATEMATICA - GEEM.

B. PROJECT DIRECTOR: Osvaldo Sangiorgi, Facultad de Filosofia da Universidad Mackenzie, Rua Maria Antonia 403, Sao Paulo, S. P., Brasil.

C. PROJECT HEADQUARTERS:

1. Contact: Project director.

2. Special facilities or activities available for visitor viewing: The books produced by the project are available for viewing; the staff is available for information, and visits to schools are arranged upon request.

D. PRINCIPAL PROFESSIONAL STAFF: B. Castrucci, L. H. Jacy Monteiro, R. M. Barbosa, A. Boscolo, L. Bechara, M. P. Liberman, R. Watanabe.

E. PROJECT SUPPORT: The GEEM is self supporting as a non-profit organization, supplying books and training courses for teachers. Some financial support is received from the "Ministerio de Educacao e Cultura" and "Secretaria de Educacao do Estado de Sao Paulo."

F. PROJECT HISTORY:

1. Principal originators: Osvaldo Sangiorgi and George Springer.

2. Date and place of Initiation: October, 1961; University Mackenzie.

3. Overall project purpose: To improve the teaching of mathematics in high schools and elementary schools, through better curricula, better teaching methods and better-prepared teachers.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:

1. To help school teachers to increase their knowledge of mathematics by offering summer courses, in-service training, seminars and group discussions.

2. To provide texts aimed at improving the background in mathematics of school teachers. The books can also be used by better secondary students.

3. To work with educational authorities toward better mathematics curricula for state schools.

4. To cooperate with any group interested in the improvement of school mathematics.

Project objectives are stated in reports, bulletins and some journal articles.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Lectures, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Not answered.

K. MATERIALS PRODUCED:

1. Matematica Moderna para o Ensino Secundario (Modern Mathematics in Secondary Schools).
2. Um Programa Moderno de Matematica para o Ensino Secundario (translation of the original "Un programme moderne de mathematique pour l'enseignement secondaire" OECE)
3. Elementos da Teoria dos Conjuntos (Elements of Set Theory)
4. Combinatoria e Probabilidade (Probability).
5. Iniciacao as Estruturas Algebricas (Introduction to Modern Algebra).
6. Introducao da Matematica Moderna na Escola Primaria (Introduction of Modern Mathematics in the Elementary School).

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: All books listed in K. Address: GEEM - Rua Maria Antonia 403, Sao Paulo, S. P. Brasil.

Costs:
1. US $2.00
2. US $2.00
3. US $1.50
4. US $2.50
5. US $4.00
6. US $2.00

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Portuguese.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: No translation plans at present.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Polinomios e divisibilidade (Polynomials and divisibility); Modern Mathematics for Elementary School Teachers.

Q. PROJECT IMPLEMENTATION: No precise data is available. The GEEM keeps contact with approximately 500 high school teachers.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Consultant services are available for teachers.
2. Activities conducted for pre-service and in-service teacher training: Activities are described in H-1. Drive-in conferences and in-service institutes are financed by the institutions requesting them.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: The material is described in items F and M.

S. PROJECT EVALUATION: Evaluated by project staff.

T. PROJECT PUBLICITY: Not answered.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:
1. New publications.
2. Courses.
3. Course delivered by visiting professor Ghunter Pickert from Germany.

A. PROJECT TITLE: SCIENCE EDUCATION PROJECTS FOR PRIMARY, HIGH SCHOOL AND COLLEGE LEVEL(FUNBEC).

B. PROJECT DIRECTOR: Ernesto Giesbrecht, Scientific Director, Box 2921, Sao Paulo, Brazil.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Research Center, Training Center, shops for production of equipment. Visitors can follow the whole range of activities. University dormitories are available.

D. PRINCIPAL PROFESSIONAL STAFF: Myriam Krasilchik, teacher training biology; Antonio Teixeira, physics; Angelica Ambrogi, chemistry; Rail Gebara Jose, general sciences; Nabor Ruegg, earth sciences; Lidia Lamparelli, mathematics; Desna Celoria, publications; Manuel Jorge, equipment; Julieta Ormastroni, executive director.

E. PROJECT SUPPORT:
1. Organizational agency: None.
2. Funding agencies: Ford Foundation; State of Sao Paulo Research Foundation.

F. PROJECT HISTORY:
1. Principal originators: Isaias Raw, M.J. Ormastroni, J. Cavalcanti, and P.M. da Rocha.
2. Date and place of Initiation: 1952; Sao Paulo.
3. Overall project purpose: Improvement of secondary school science education with emphasis on experimentation and discovery by the students.

G. PRESENT COMMERCIAL AFFILIATIONS: The Foundation makes contracts with publishers to publish and distribute books and publications, controlling its rights. Equipment is produced and supplied directly by the Foundation to schools and students.

H. PROJECT OBJECTIVES: The Foundation puts its emphasis on reevaluation of science education by active scientists and educators to persuade the school system and teachers, from primary schools to the university, to use new ideas. Emphasis is on experimentation in the school, done by the students, with low cost equipment or at home with small, low cost kits. The Foundation generates new materials, units and equipment and introduces and adapts others based on foreign projects.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Lectures, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science education projects for primary, high school and college level for average students.

K. MATERIALS PRODUCED:

1. Primary School Science, first and second of four volumes.
2. Mathematics, adapted from SMSG, 6 of a series of 7 vol.
3. Mathematics, FUNBEC project, 1 of 4 volumes.
4. Mathematics, CECIBA project, 1 of 4 volumes.
5. General Science, FUNBEC, 2 volumes.
6. Conservation project (including exact and social sciences - "conservation" of matter, energy, life, species, human heritage and social structure), 1 of 6 volumes.
7. IPS - translation of the American project, complete.
8. PSSC - translation of the American project, complete.
9. CBA - translation of the American project, complete.
10. CHEM-STUDY - translation of the American project, complete.
11. BSCS - blue version - adaptation of the American project, complete.
12. BSCS - green version - adaptation of the American project, preliminary version.
13. BSCS blocks - adaptation of Plant Growth and Development.
14. Physiology - lab guide, complete.
15. Psychology - lab guide, complete.
16. Earth Sciences - ESCP, adapted preliminary lab guide.
17. Illinois Astronomy Project - preliminary version adapted, 2 volumes.
18. Electronics - first of three volumes.
19. Human genetics - series 2 of 5 volumes.
20. Book kits - series of kits resembling pocketbooks, including equipment and instructions for direct use by students of different age levels, 20 of a series of over 50.
21. Berkeley Physics Course - 2 of 5 volumes, adaptation.

L. MATERIALS AVAILABLE FREE: Any textbook (lab guide is generally bound together) and teachers guide. General report in English, newsletter in English to be issued monthly.

M. MATERIALS PURCHASABLE: All of the materials referred to in question K can be ordered from: FUNBEC - Caixa Postal 2921, Sao Paulo, S.P., Brazil. Other materials that can be ordered: equipment to go with the different projects, kits, book-kits.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: All in Portuguese.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Spanish and English.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Not applicable.
2. Total number of teachers using any of the materials: Over 10,000.
3. Total number of students using any of the materials: Over 500,000.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and located of selected schools where the course is being taught: Throughout the Brazilian School System.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: The FUNBEC maintains a leadership training program for the Centers, and provides a special training program by contracts in any of the twenty-two states. Six Centers have been established (CECINE in Recife, CECIBA in Salvador, CECIMIG in Belo Horizonte, CECISP in Sao Paulo and CECIRS in Porto Alegre) that provide training by conducting summer institutes, in-service, advisors, and six months training programs.
2. Activities conducted for pre-service and in-service teacher training: Activities are conducted in the six Centers, and a number of seminars have been organized by them at different locations.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION: Evaluation has been done considering indirect evidences of achievement. A program of evaluation is being organized with the support of Ford Foundation.

T. PROJECT PUBLICITY: BSCS-Newsletter No. 31 - BSCS in Brazil.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Completion of general sciences, IPS, CHEMS projects; publication of the text Biochemistry, lab guides for experimental psychology; release of a series of book-kits; release of volume one of the primary school science and high school mathematics (FUNBEC and CECIBA).

V. PLANS FOR THE FUTURE: A project at the college level of combined physics and chemistry is being planned; new project on conservation is being worked out; an adaptation of Nuffield Chemistry is going to press; Project Physics is being studied, as is a project that will introduce a combination of general science and social science.

A. PROJECT TITLE: GENERAL EDUCATION PROGRAM IN NATURAL SCIENCE.

B. PROJECT DIRECTOR: Thomas H. Leith, Director of Division of Natural Science, Atkinson College, York University, Downsview, Ontario. 416-635-3181.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. L.T. White, Assoc. Prof; Mr. R. Longcare, Asst. Professor; Mr. L.E. Hodgins, Asst. Professor; Dr. P. Rajagopal, Professor.

E. PROJECT SUPPORT:
York University.

F. PROJECT HISTORY:
1. Principal originator: T.H. Leith.
2. Date and place of Initiation: 1966; Atkinson College, York University.
3. Overall project purpose: General education courses on National Science for university students pursuing a degree (ordinary or honor) on a part-time basis.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: We have tried to develop unique curricula introducing non-science (mostly) college students to the nature of the Natural Sciences.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, Seminars, Films, Ancillary notes.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Biological and physical sciences; history of science and technology; freshmen and senior level.

K. MATERIALS PRODUCED:
1. Reading list for the Preparation of Term Papers in Natural Science Courses.
2. Course outline "The Nature and Growth of the Physical Sciences".
3. Course outline "The Intellectual and Social Milieu of Modern Science".
4. Notes to accompany lectures in The Nature and Growth of the Physical Sciences.

L. MATERIALS AVAILABLE FREE: Not answered.

M. MATERIALS PURCHASABLE: Items 2, 3 and 4 from project director; $3.00.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: New course syllabi.

Q. PROJECT IMPLEMENTATION: Used only at York University.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Contact T.H. Leith.
2. Activities conducted for pre-service and in-service teacher training: Many of our part-time students are elementary school teachers.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: Course evaluation questionnaires in certain courses were given.
4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: None.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE: Further development of curricular offering.

A. PROJECT TITLE: SHERBROOKE MATHEMATICS PROJECT.

B. PROJECT DIRECTOR: Dr. Z.P. Dienes, Director, Psycho-Mathematics Research Center, Sherbrooke University, Sherbrooke, P. Quebec, Canada. (819)569-7431, Ext. 356. or 1960 Adam Street, Sherbrooke, P. Quebec, Canada. (819)569-8446.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Visits to center and pilot classes can be arranged the first week of each month; seminars are bilingual.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. Z.P. Dienes, Director; Mr. Graham Cantieni, Art & Creativity; Mr. Dieter Lunkenbein, Finite Mathematical Systems; Dr. Ernest Richer, Structural Linguistics; Dr. Willi Walser, Probabilistic Thinking; Mr. John Williams, Experimental Design; Mr. Bela Parkanyi, Electronic Design.

E. PROJECT SUPPORT:
1. Organizational agencies: International Study Group for Mathematics Learning, (ISGML) in general and many of its constituent members in particular such as: City of Sherbrooke School Board; Papua/New Guinea Education Department; Vancouver, Canada's Simon Fraser Education Department; Santa Barbara Mathematics Research Laboratory, California; as well as Ravenna, Italy; Heidelberg, Germany; Canary Islands and Budapest, Hungary, Mathematics Projects.
2. Funding agencies: Science Faculty, University of Sherbrooke; Conseil des Arts du Canada; Quebec Minister of Education.

F. PROJECT HISTORY:
1. Principal originator: Dr. Zoltan Dienes.
2. Date and place of Initiation: January 1965; Sherbrooke, Canada.
3. Overall project purpose: The study of learning abstract structures.

G. PRESENT COMMERCIAL AFFILIATIONS: See M below.

H. PROJECT OBJECTIVES: We seek to build a mathematically and psychologically sound curriculum; the methods employed in such a curriculum are determined by the psychological data of the child's development and its content by the inherent mathematical relationships in the foundations of mathematics.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups, Practical workshop activity with concrete materials.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Grades between kindergarten and grade 7, rising to 11th grade as the age of the subjects increases; all ability levels. Mathematics, all grades; logic, all grades; semantics, grades 1 & 2; structural linguistics, grades 3-7.

K. MATERIALS PRODUCED:

1. First Years in Mathematics (3 vol.) Educational Supply Association, 1966.
2. Geometry Through Transformations (3 vol.) Educational Supply Association, 1967.
3. Building Up Mathematics, Hutchinson, Third Edition, 1967.
4. The Power of Mathematics, Hutchinson, 1964.
5. Modern Mathematics for Young Children, Educational Supply Association, 1965.
6. Thinking in Structures, Hutchinson, 1965.
7. Introduction to the Axiomatic Method, 1968 (100 p.) Using Geometrical Structures.
8. L'Apprentissage de la Logique, OCDL, 1966 (52 p.) Education Nouvelle, Montreal.
9. The Arithmetic and Algebra of Natural Number (Manual of instructions for use with the Multibase Arithmetic Blocks and the Algebraical Experience Materials) Educational Supply Association, 1965 (42 p.).
10. States and Operators (Experimental instruction cards) (The revised: Algebra: Part 1)
11. Introduction to Modern Algebra: Part 11 (Mixed Operators)
12. Introduction to Modern Algebra: Part 111 (Linear Equations & Polynomials) (in press).
13. Introduction to Modern Algebra: Part IV , Instruction Cards and Stories for Children on Linear Algebra (in press).
14. Relations, Herder, (in the press) (Work cards and teacher instructions).
15. Introduction Aux Relations, 1967 (34 p.) (Presented at a meeting of UNESCO).
16. Fractions: An Operational Approach, Herder, 1967.
17. Le Passage au Nombre Naturel, 1968, OCDL, (in press).
18. Les Ensembles, 1968, OCDL, (in press).
19. Les Aventures De Gilles Et Valerie, OCDL, (in press).
20. L'Etude De Quelques Structures Mathematiques, 1968 (22 p.)
21. La Generation Des Structures - On Generating Structures, 1967 (22 p.).
22. The Construction of Rings.
23. The Study of Powers, Roots and Logarithms, 1968, Educational Supply Association-Hutchinson.
24. The Learning of Group Structures by Young Children, 1968 (8 p.) UNESCO Institute for Education.
25. Mathematics In the Primary School, 1964 (222 p.), MacMillan, Melbourne, Australia.
26. Mathematics in Primary Education, 1965 (165 p.), UNESCO Institute for Education (Prepared by ISGML and compiled by Dr. Z.P. Dienes).

27. Concept, Formation and Personality, 1959 (93 p.), Leicester University Press.
28. An Experimental Study of Mathematics Learning, 1964 (207 p.) Hutchinson.
29. The Growth of Mathematical Concepts in Children Through Experience, 1959 (Reprint from Educational Research)
30. Approach to Modern Mathematics, 1967, (146 p.) (Text for future teachers)
31. Prenumber Learning Situations, 1967 (32 p.)
32. Introducing the Elements of Mathematics, 1969 - Herder (in the press)
33. Six Etapes De L'Apprentissage, 1969, OCDL (in press).
34. Logical blocks: Desk top or pocket size.
35. Logic charts, work cards, arrow set, logic transparencies.
36. Multibase arithmetic blocks (M.A.B.).
37. Algebraical experience materials (A.E.M.). (Complete set in wood available with work cards and manual).
38. Peg boards and balance.
39. Sets of extended materials.
40. Multibase triangular trapezoid materials.
41. Geometry set by Kugeli.
42. Grid set.

For a complete bibliography, including translations of items above, please contact the project director.

L. MATERIALS AVAILABLE FREE: List of materials and publications; brochure about the Center, from: The Psycho-Mathematics Research Center.

M. MATERIALS PURCHASABLE: Items 1-33.
1. Education Nouvelle, 342 Terrasse Saint-Denis, Montreal 129, Quebec, Canada.
2. Herder & Herder, 232 Madison Ave., New York City, New York, 10016.
3. OCDL, 65 rue Claude-Bernard, Paris 5^e, France.
4. Herder Verlag Abt. Padagogik, D 78 Freiburg, Federal Republic of Germany.
5. Bayerischer Rundfunk, 8 Munchen 2 Postfach, Federal Republic of Germany.
6. UNESCO Institute for Education, Feldbrunnenstrasse 70, Hamburg, Federal Republic of Germany.
7. Educational Supply Association Ltd., Pinnacles, Harlow, Essex, England.
8. Hutchinson & Co., 178-202 Great Portland Street, London W1, England.
9. Leicester University Press, Leicester University, England.
10. Franz Schubiger, Postkonto W 111b 286, Winterthur.
11. Organizzazioni - Speciali - Firenze, Via R. Franchi N. 5, Firenze, Italy.
12. Editorial Teide, Bory y Fontesta 18, Barcelona 6, Spain.

13. The MacMillan Co. of Australia Pty. Ltd., 107 Moray St., South Melbourne, Victoria 3205, Australia.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: French and/or English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: French-English and vice versa; Italian; Spanish; German and presently into Dutch.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. Electronic materials: variable three-generator finite group machine; ring and field machine up to 12 elements with predictions recordable three steps ahead with electronic memory.
2. Probability and Statistics Learning Sequences for grades 4 through 6.
3. Learning Sequences for the symbolization and formalization stage of mathematics learning.
4. Integrated scheme of learning sequences for mathematics, logic, semantics, art and reading and writing, starting with grade 1.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 64 have adopted it entirely; 550 teachers in the whole of Sherbrooke are using a slightly adapted version; an unknown number of teachers in affiliated Projects of ISGML throughout the world.
2. Number of students involved: The number of teachers times approximately thirty.
3. Number of schools involved: Sherbrooke: 7 - full implementation; about 20 gradual implementation.
4. Total number of teachers using any of the materials: Undeterminable as this involves so many different parts of the world.
5. Are the totals stated in 1, 2, 3 and 4 estimated or definitive? The totals in 1, 2, and 3 are definitive.
6. Name and location of selected schools where the course the course is being taught: Ecoles Eymard, Laporte Schools, Sherbrooke, Quebec, Canada; Tatana School, Papua, New Guinea; Cowandilla Demonstration School, South Australia; Fleming School, New York City, U.S.A.; Jazmin Utca School, Budapest VIII, Hungary; Pestalozzi School, Heidleburg, Germany; Ecole Decroly, St. Mande, Val de Marne, France 94.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Free use of Center and in Sherbrooke, regular visits by members of the Center. Films and video-tapes describing work are available. Regular workshops are organized by local school board and staffed by members of the Center.

2. Activities conducted for pre-service and in-service teacher training: Abolition of all lectures and their replacement by workshop and seminar-type of activity using concrete situations; regular six-week accredited workshop during the summer at the University of Sherbrooke; Saturday morning accredited courses during the year.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Workshops are financed by fees largely re-imbursed by local school boards. Tuition fee for six-week course is $260.00 (Canadian). Many available educational materials, films, and publications are available for use while preparing teachers.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by the National Foundation for Educational Research in England and Wales.
2. Pertinent published research studies:
   (a) Biggs, J.B., Anxiety, Motivation and Mathematics Learning, N.F.E.R., 1963.
   (b) Biggs, J.B., Mathematics and the Conditions of Learning, N.F.E.R., 1965.
   (c) Dienes, Z.P., An Experimental Study of Mathematics Learning, Hutchinson, 1963.
   (d) Dienes, Z.P. and Jeeves, M.A., Thinking in Structures, Hutchinson, 1966.
3. Brief abstract of in-house or unpublished research: The following studies have been conducted: The role of noise in learning; the stages in a learning cycle leading to knowledge of formal systems; preferences for mobile or fixed axes with the children; study of the optimum order of activities making major use of different sense modalities for maximizing transfer effects; probabilistic thinking; problems of communication; effects of grouping, posture and relative positioning of children on learning.
4. Additional evaluative data available to interested individuals: Data are available from: Dr. Z.P. Dienes; Mr. E.W. Golding, Cowandilla Demonstration School, Brooker Terrace, Cowandilla, South Australia; National Foundation for Educational Research in England and Wales, 79 Wimpole Street, London, W.1., England; Mr. Irving Kreitzberg, Principal, P.S. 41, 116 West 11th Street, New York, New York, U.S.A.

T. PROJECT PUBLICITY:

1. The Formation of Mathematical Concepts in Children Through Experience, 1959, Education Research.
2. On Abstraction and Generalization, 1961, Vol. 31, No. 3, Harvard Educational Review: Peter F. Carbon, Graduate School of Ed., Harvard University, Longfellow Hall, 13 Appian Way, Cambridge, Mass. 02138.
3. On the Learning of Mathematics, 1963, March, The Arithmetic Teacher: Mrs. Marguerite Brydegaard, San Diego State

College, San Diego, California 92115.
4. Some Basic Processes Involved in Mathematics Learning, 1967, Booklet: Research in Mathematics Education: National Council of Teachers of Mathematics, 1201 Sixteenth Street, N.W., Washington, D.C. 20036.
5. Some Reflections on Learning Mathematics, 1969.

Available from project director.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:
1. The initiation of the Project in all grades one of Sherbrooke.
2. Completion of electronic equipment.
3. Making of a series of 20 colored films - Super 8 - to illustrate the work of the Project.
4. The intensification of the work on the integrated program. A start has been made on probability.

V. PLANS FOR THE FUTURE:

Work on the passage from abstract representation to symbolization and formalization; work on structural learning using our machines; the establishment of in-service teacher training to reach every teacher intensively within five years in local area. Five-year Plan for constructing a secondary school curriculum to be used only by products of the elementary school curriculum. Co-ordination of the work in Papua, New Guinea, the British Solomons and the U.S. Trust Territories. Regular yearly workshops as follows: London, England-April; New Guinea and the Mariana Islands - May; Melbourne, Australia - May; Sherbrooke, Canada - July, August.

A. PROJECT TITLE: SCIENCE/MATHEMATICS CURRICULUM DEVELOPMENT PROJECT, MINISTRY OF EDUCATION, CEYLON.

B. PROJECT DIRECTOR: Mr. B.J.P. Alles, Deputy Director General (Secondary Education), Ministry of Education, Colombo 2, Ceylon.

C. PROJECT HEADQUARTERS:
1. Contact: Chief Education Officer, Curriculum Development Centre, Bauddhaloka Mawata, Colombo 7, Ceylon. Tel: 84386.
2. Special facilities or activities available for visitor viewing: Science/Mathematics Curriculum Development material; evaluation of science and mathematics; in-service education for science/math teachers.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. J. Ratnaike, Chief Education Officer (Curriculum Development); Mr. D.A. Perera, Chief Education Officer (Mathematics); Mr. A.M. Ranaweera, Chief Education Officer (Science); Mr. D. Weerasinghe, Chief Education Officer (In-Service Education).

E. PROJECT SUPPORT:
1. Organizational agency: Government of Ceylon, Ministry of Education.
2. Funding agencies: Government of Ceylon; UNESCO - UNICEF; CREDO, (U.K.), Colombo Plan.

F. PROJECT HISTORY:
1. Principal originators: Secondary Education Division, Ministry of Education.
2. Date and place of Initiation: 1961; Colombo.
3. Overall project purpose: Quality improvement of science, math, education in Ceylon schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:
1. Production of curriculum materials in science and mathematics for grades 6 - 12.
2. Improvement of evaluation practices in science and mathematics.
3. In-service training of science and mathematics teachers.
4. Improvement of school practices - school supervision, assessment of teaching.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups, In-service Vacation Institutes, Distribution of Resource Material.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Biology, physics, chemistry; grades 9, 10, 11, 12; age 13 to 17.

Mathematics, grades 6 - 10, age 10 to 15.

K. MATERIALS PRODUCED:
1. Schemes of Work and Syllabuses of Instruction - Chemistry, Grades 9, 10.
2. Schemes of Work and Syllabuses of Instruction - Physics, Grades 9, 10.
3. Schemes of Work and Syllabuses of Instruction - Biology, Grades 9, 10.
4. Schemes of Work and Syllabuses of Instruction - Mathematics, Grades 6, 7, 8.
5. Book of Test Items - Chemistry.
6. Text books for Grades 9, 10, Chemistry, Physics, Biology.
7. Text books for Grades 6, 7, Mathematics.

L. MATERIALS AVAILABLE FREE: Items 1, 2, 3, 4, 5. (limited supply) From the: Curriculum Development Centre, Bauddhaloka Mawata, Colombo 7, Ceylon.

M. MATERIALS PURCHASABLE: Items 6, 7. Available only in the national languages, Sinhala and Tamil, from the: Education Publications Department, Colombo 3, Ceylon.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: 1 - 5, in English. 6, 7, in Sinhala and Tamil.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: 1 - 5 will be translated to Sinhala, Tamil.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Curriculum material in chemistry, physics, and biology for grades 11-12; mathematics, grades 9-10.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course; All teachers in Ceylon schools.
2. Number of students involved: Science 50,000.
3. Number of schools involved: Science 550.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: All schools in Ceylon teaching science and mathematics.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Consultations with field supervisory staff, curriculum design staff, visiting specialist staff.
2. Activities conducted for pre-service and in-service teacher training: In-service programme for all science, math teachers: (a) week-end, one day or two days study circles. (b) two or three week vacation institutes.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies:

(a) Theoretical Constructs in Curriculum Development and Evaluation, Working Paper No. 1, Ministry of Education, Ceylon.

(b) Notes on Structural and Functional Aspects of an Educational System Relevant to Educational Administration.

(c) Financing and Cost of Second Level General Education.

3. Brief abstract of in-house or unpublished research: Not answered.

4. Additional evaluative data available to interested individuals: Further data are available by direct communication with the respective chief education officer in charge at the Curriculum Development Centre.

T. PROJECT PUBLICITY:

Evaluation in Chemistry - Report of International Workshop, Ceylon, August 1968. UNESCO - IUPAC Publication.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

Revision of the grade 11-12 chemistry, physics, and biology syllabuses.

Primary science, math programme for grades 1-5.

A. PROJECT TITLE: PROYECTO DE PERFECCIONAMIENTO EN SERVICIO, CIENCIAS NATURALES (P.P.S.).

B. PROJECT DIRECTORS: Jorge Arancibia, Alexis Labarca, Hector Munoz, Irene Villarroel, Bartolome Yankovic. Centro de Perfeccionamiento, Experimentacion e Investigaciones Pedagogicas. Barnechea, Santiago 10, Chile. 3015, Las Condes.

C. PROJECT HEADQUARTERS:
1. Contact: Any of the directors.
2. Special facilities or activities available for visitor viewing: None, but visitors will be welcome to talk with staff, view materials and other aspects of the project.

D. PRINCIPAL PROFESSIONAL STAFF: Jorge Arancibia, Alexis Labarca, Hector Munoz, Pedro Turina, Irene Villarroel, Bartolome Yankovic of C.P.E.I.P. (Centro de Perfeccionamiento, Experimentacion e Investigaciones Educacionales). Alfonso Ruiz of Facultad de Filosofia y Educacion, Universidad de Chile.

E. PROJECT SUPPORT:
1. Organizational agency: C.P.E.I.P.
2. Funding agency: C.P.E.I.P.

F. PROJECT HISTORY:
1. Principal originators: Jorge Arancibia, Alexis Labarca, Hector Munoz, Bartolome Yancovic.
2. Date and place of Initiation: April, 1969; C.P.E.I.P.
3. Overall project purpose: To try new and more effective ways of in-service training for elementary school science teachers.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Project objectives are stated in the Introduction to PPS-1 (see K) and in Revista de Educacion, No. 18, Santiago, Chile (see T). PPS is an effort to develop a self-instructional in-service training program mainly with the following characteristics:
1. It must reach any teacher in the country, if necessary.
2. It must not separate teacher from her (or his) students during course.
It is directed, in its first phase, to elementary school science teachers, grades 5 through 8. Self-instructional materials are sent by mail to teachers in five provinces in Chile. These materials contain: activities for the teacher to do, evaluation sheets for the teacher to complete and send back to staff, commentaries and instructions for classroom activities and evaluation materials for the teacher's students. Teacher training is thus strongly related to classroom activities. One may dare say that classroom activities are here

the main core of the teacher training. This cannot be done in normal training courses in which teachers are separated from their students to attend intensive courses at main cities. Being a self-instructional course delivered by mail it may reach almost any teacher in the country. Effectiveness is being investigated.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Self-instruction materials.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Instructional materials are intended for science teachers teaching at grades 5 through 8.

K. MATERIALS PRODUCED:
1. PPS-1. Proceso: Observar.
2. PPS-2. Proceso: Medir.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
PPS's 3 through 14.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 140.
2. Number of students involved: About 4,000.
3. Number of schools involved: 120.
4. Total number of teachers using any of the materials: 200.
5. Total number of students using any of the materials: 8000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? 2, 4 and 5 are estimated.
7. Name and location of selected schools where the course is being taught: Escuela No. 1, Castro; Escuela No. 6, Puerto Montt; Escuela Salvador Sanfuentes, Santiago.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Teachers are encouraged to contact staff any time.
2. Activities conducted for pre-service and in-service teacher training: This is an in-service training program.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: All materials are for in-service use.

S. PROJECT EVALUATION: Evaluation is being carried out and data are not available as yet. Please contact any of the directors for further information.

T. PROJECT PUBLICITY:
Arancibia, J., Labarca, A., Munoz, H and Yancovic, B., "Proyecto de Perfeccionamiento en Servicio para Profesores de 5^o y 6^o ano de Educacion General Basica", Revista de Educacion, No. 18, Julio 1969, Santiago Chile.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:
Phase I of the Project, corresponding to science teachers of grades 5 through 8 is to be completed in 1972.
Phases II and III, corresponding to grades 1 through 4, and 9 and 10, will be started in 1972.

A. PROJECT TITLE: BSCS - GREEN VERSION TRANSLATION AND ADAPTION INTO SPANISH FOR TROPICAL LATIN AMERICAN COUNTRIES.

B. PROJECT DIRECTOR: Fabio Heredia-Cano, Departamento de Biologia, Universidad de Antioquia, Medellin, Colombia.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Department of Biology, Universidad de Antioquia, Medellin; Editorial Norma, Cali.

D. PRINCIPAL PROFESSIONAL STAFF: Fabio Heredia-Cano-Director Dept. of Biology, Universidad de Antioquia; Gabriel Roldan - P. Assistant Professor, Universidad de Antioquia.

E. PROJECT SUPPORT:
1. Organizational agencies: Not answered.
2. Funding agency: Universidad de Antioquia.

F. PROJECT HISTORY:
1. Principal originators: Humberto Gomez-Osorio, Roberto Galan-P, Fabio Heredia-Cano.
2. Date and place of Initiation: 1963; Universidad del Valle.
3. Overall project purpose: The advancement of the biology teaching in Latin America.

G. PRESENT COMMERCIAL AFFILIATIONS: Editorial Norma - Cali, Colombia.

H. PROJECT OBJECTIVES: The introduction of the BSCS materials in Latin American countries means the introduction of a new philosophy and methodology in the teaching of biology, mainly in the tropics.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, Lectures, Discussion groups, Field work, Audio-visual aids.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: General biology for secondary school level.

K. MATERIALS PRODUCED:
1. "Curso de Biologia" (Three editions).
2. "Biologia: El Hombre y su Ambiente", (first edition, Jan. 1970).

L. MATERIALS AVAILABLE FREE: Not answered.

M. MATERIALS PURCHASABLE: Item 2., from: Editorial Norma, Cali, Colombia.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: "Manual del Profesor" (BSCS) June 1970.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Not answered.
2. Number of students involved: Not answered.
3. Number of schools involved: Not answered.
4. Total number of teachers using any of the materials: Not answered.
5. Total number of students using any of the materials: Not answered.
6. Name and location of selected schools where the course is being taught: Teachers, students and schools from at least eight Latin American Countries.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Universities in the above mentioned countries.
2. Activities conducted for pre-service and in-service teacher training: Summer and regular courses for secondary school teachers, paid by governments and universities in the countries above.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers. Not answered.

S. PROJECT EVALUATION: Not answered.

T. PROJECT PUBLICITY: BSCS Newsletters.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Translation and adaptation of BSCS Green Version for Latin American Tropical countries.

V. PLANS FOR THE FUTURE: See the project presented by the BSCS to the Ford Foundation.

A. PROJECT TITLE: IMPROVEMENT OF SCIENCE TEACHING IN COLOMBIA.

B. PROJECT DIRECTOR: Alberto Ospina, Fundacion para el Fomento Educativo, Calle 19 #6-68, Oficina 1007, Bogota, Colombia.

C. PROJECT HEADQUARTERS:
1. Contact: Josue Munoz, Director, Instituto de Ciencias, Improvement of Science Teaching in Colombia - Carrera 13 #38-83, Bogota, Colombia. 459942.
2. Special facilities or activities available for visitor viewing: Laboratory, audio visual aids, work shops, library, etc.

D. PRINCIPAL PROFESSIONAL STAFF: Josue Munoz, Director; Vicente Casas, Physics Program; Rafael Carmona, Mathematics Program; Yolanda de Bula, Program for Introductio to Science.

E. PROJECT SUPPORT:
1. Organizational agencies: Fundacion para el Fomento Educativo, MIT Club de Colombia, Colombian Ministry of Education, Instituto Colombiano de Pedagogia.
2. Funding agencies: Fundacion para el Fomento Educativo, Colombian Ministry of Education, Instituto Colombiano de Pedagogia.

F. PROJECT HISTORY:
1. Principal originators: Alberto Ospina, Jose Munoz, MIT Club de Colombia.
2. Date and place of Initiation: The program was initiated in 1965. The Science Institute in 1966; Bogota, Colombia.
3. Overall project purpose: To raise the low quality of science teaching in Colombia, especially in the primary and secondary levels. The need to bring a renovation in science teaching. The desirability of adopting the new science materials.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: To improve science teaching in Colombia; to make available new materials and textbooks for Colombian science teachers and students; to promote science among young Colombian students; to create interest and incentive in science education.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Lectures, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Physics, P.S.S.C.; Introduction to Physical Science - IPS; Physics Course C.E.F. of Colombia; Harvard Physics Project; Light Project of UNESCO; Biology, B.S.C.S.; Chemistry, CHEMS; Berkeley Physics; Modern Mathematics.

K. MATERIALS PRODUCED:
   1. P.S.S.C. equipment and textbooks.
   2. C.E.F. physics equipment and textbooks.
   3. Newsletter.
   4. Booklet of Instituto de Ciencias.
   5. The Science Fair.
   6. The Science Club.
   7. CHEMS textbook in Spanish.
   8. BSCS textbook in Spanish.

L. MATERIALS AVAILABLE FREE: Items 3, 4, 5 and 6.

M. MATERIALS PURCHASABLE: Items 1, 2, 7 and 8. From address listed in "C".

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION:
   1. Number of teachers who have adopted the entire course: 800.
   2. Number of students involved: 24,000.
   3. Number of schools involved: 90.
   4. Total number of teachers using any of the materials: 1500.
   5. Total number of students using any of the materials: 3500.
   6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
   7. Name and location of selected schools where the course is being taught: Instituto de Aplicacion Pedagogica, Universidad Nacional; Colegio Marymount; Colegio Carrasquilla; Colegio Studium; Colegio Nacional Restrepo Millan; Instituto de Ensenanza Media, Universidad Pedagogica Nacional; etc.

R. TEACHER PREPARATION:
   1. Consultant services available for teachers using the materials: Films, audio visual aids, library, equipment, meetings, conferences for special groups, etc.
   2. Activities conducted for pre-service and in-service teacher training: This institute has a group of specialist teachers to give training courses continually. Coordinate courses for university teachers are financed by the Fullbright Commission.
   3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: This Institute has been using P.S.S.C., I.P.S., B.S.C.S. lab. equipment. Each student-teacher pays $15.00 (U. S.) for the course and the textbook.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: Not answered.
4. Additional evaluative data available to interested individuals: Not answered.

T. PROJECT PUBLICITY: None.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:

Training Courses:

1. Berkeley Physics Course - Universidad de Antioquia - Medellin.
2. Modern Mathematics - Universidad Francisco de Paula Santander - Cucuta and permanent courses in the Institute.

Scientific Publications:

1. Space Science conferences with the cooperation of NASA.
2. First and Second National Science Fairs.
3. Science Clubs.
4. Scientific Exposition from the PALAIS DE LA DECOUVERTE DE PARIS.
5. Courses of construction of material for teaching science.

International Seminars:

1. Sobre Ciencia y Tecnologia.
2. Sobre Administracion de la Investigacion Cientifica.
3. Sobre Ensenanza de Ciencias.

V. PLANS FOR THE FUTURE:

1. COURSES: University level: Berkeley Physics - Teaching Science Methodology.
2. COURSES: Secondary level: Physics, chemistry, biology, introduction to science, and earth science with the cooperation of O.E.A.
3. Third National Science Fair.
4. First National Olimpiad of Mathematics.
5. Scientific magazine for teachers.
6. Science Clubs Program.
7. Teaching materials for science education.

A. PROJECT TITLE: CENTER FOR THE PREPARATION OF TEACHING MATERIALS FOR SCIENCE INSTRUCTION.

B. PROJECT DIRECTOR: Mesias Huaringa Ricci, UNESCO Regional Expert, P.O. Box 5298, San Jose, Costa Rica. Telephone: 22029.

C. PROJECT HEADQUARTERS:
1. Contact: UNESCO, Place de Fontenoy, Paris 7, France.
2. Special facilities or activities available for visitor viewing: Not answered.

D. PRINCIPAL PROFESSIONAL STAFF: Carlos Quesada, physics and mathematics teacher; Grace Castro, biology and chemistry teacher; Franklin Castro and Miguel Angel Villalobos, technicians.

E. PROJECT SUPPORT:
1. Organizational agency: UNESCO.
2. Funding agency: Several governments in Central America.

F. PROJECT HISTORY:
1. Principal originator: Originated through an agreement of the Central American governments in a ministerial conference in Tegucigalpa.
2. Date and place of Initiation: September, 1968; San Jose, Costa Rica.
3. Overall project purpose: Improvement of science teaching at the primary and secondary levels.

G. PRESENT COMMERCIAL AFFILIATIONS: Not answered.

H. PROJECT OBJECTIVES:
1. Preparation of teaching material.
2. Training of teachers in the use of the materials and of audio-visual aides.
3. Diffusion of modern trends in science teaching.
4. Preparation of teacher's guides.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Programmed instruction, Laboratory investigations, Lectures, Seminars, Practice teaching, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Not answered.

K. MATERIALS PRODUCED:
1. Kits: air, mechanics, heat, light, magnetism, electricity, planetarium, rocks, living things.
2. Transparencies: living things.
3. School first-aid kit.

L. MATERIALS AVAILABLE FREE: At this time the kits in K exist only as prototypes. We hope to mass produce them at the

Center for the Preparation of Teaching Materials for Science Instruction.

M. MATERIALS PURCHASABLE: Prices are being set for the kits.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
1. Adaptation of IPS.
2. Adaptation of UNESCO Pilot Project "Physics of Light".

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 90 elementary.
2. Number of students involved: 2,700.
3. Number of schools involved: 30.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: 50 primary schools in San Jose, Costa Rica.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: At the request of teachers.
2. Activities conducted for pre-service and in-service teacher training: Seminars in the four normal schools and in the College of Education at the University of Costa Rica, financed by the government. In-service seminars financed by UNESCO-UNICEF.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished research: Not answered.

T. PROJECT PUBLICITY: Not answered.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: November 1968: Central American meeting on the teaching of primary science. 1969: preparation of prototypes for science teaching and introduction of the material in Central American countries. 1970: Seminars in San Jose, Costa Rica.

V. PLANS FOR THE FUTURE:

1. Writing of the text "How to Use Minimum Science Equipment."
2. Seminars in Central America.

A. PROJECT TITLE: CENTER FOR THE MODERNIZATION OF PHYSICS TEACHING (KABINET PRO MODERNIZACI VYUCOVANI FYZICE).

B. PROJECT DIRECTOR: Miloslav Valouch, Professor of Physics, Faculty of Mathematics and Physics of the Charles University, Archangelska 2, Praha 10, Czechoslovakia.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Visit to an experimental school with trial physics teaching.

D. PRINCIPAL PROFESSIONAL STAFF: Team Leaders: Professor Frantisek Kahuda and Assistant Professor Stanislav Novy.

E. PROJECT SUPPORT:
1. Organizational agency: Institute of Solid State Physics of the Czechoslovak Academy of Science.
2. Funding agencies: Czechoslovak Academy of Science and Union of Czechoslovak Mathematicians and Physicists.

F. PROJECT HISTORY:
1. Principal originators: Jednota ceskoslovenskych matematiku a fyziku (Union of Czechoslovak Mathematicians and Physicists).
2. Date and place of Initiation: Founded toward the end of 1965 as Center for Modernization of Mathematics and Physics Teaching and transformed into the now existing Center in 1969.
3. Overall project purpose: Theoretical and experimental study of modern physics teaching.

G. PRESENT COMMERCIAL AFFILIATIONS: The tentative materials and studies of the Center are published by the Union of Czechoslovak Mathematicians and Physicists.

H. PROJECT OBJECTIVES: The major objective of the Center program is to stimulate and to organize the theoretical and experimental research concerning the possibilities of essential heightening of the social effectiveness of physics teaching with regard to the prospective needs of a highly developed society. The results of the research will serve as foundation for successive modernization of physics teaching in primary and secondary schools and for the improvement of pre-service and in-service education of teachers.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: The objectives and the necessary minimum of the socially useful physics knowledge in general education of pupils with medium ability (age from 6 to 18 years) are studied. The methods of more profound acquaintance with important phenomena and concepts in 4th - 6th grades (systematic course of physics is beginning in 7th grade) are examined in several pilot classes.

K. MATERIALS PRODUCED: Preparatory education in Physics. A trial text for grades 4 to 6, with working sheets for pupils, prepared by a group of collaborators led by Assistant Professor Stanislav Novy.

L. MATERIALS AVAILABLE FREE: None as yet.

M. MATERIALS PURCHASABLE: Material mentioned in K through the mediation of Jednota ceskoslovenskych matematiku a fyziku (Union of Czechoslovak Mathematicians and Physicists), Spalena 26, Praha 1, Czechoslovakia.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Only in Czech.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: About 15.
2. Number of students involved: About 400.
3. Number of schools involved: 5 experimental schools.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: Fundamental nine-year schools in Praha, Brno, Bratislava, Kladno and Smecno.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Teachers in pilot schools are specially trained.
2. Activities conducted for pre-service and in-service teacher training: Not answered.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION: None.

T. PROJECT PUBLICITY: General information articles in Czech journals.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Did not appear in 1968 report.

V. PLANS FOR THE FUTURE: Evaluation of the results of trial teaching in primary school and extension to the further levels.

3

A. PROJECT TITLE: INSTITUTE FOR EDUCATION IN THE NATURAL SCIENCES.

B. PROJECT DIRECTOR: Professor Dr. Karl Hecht, 23 Kiel, Neue Universitat, Olshausenstrasse 40-60. Telephone: 593-2545

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Special facilities are not available at this date, but there are always members of the staff to give detailed information about the project.

D. PRINCIPAL PROFESSIONAL STAFF: Professor Dr. K. Hecht, Director of the Institute; Dr. Blansdorf; H. Filbrandt, Dipl. - Psych,; D. Jorgensen. Physics Department: Dr. St. V. Aufschnaiter; R. Duit; R. Faul, Dipl. - Psych.; W. Heyner, Dipl. - Phys.; P. Holck, Dipl. - Phys.; G. Lind, St. - Ass.; H. Niedderer; Dr. C. V. Rhoneck; W. Roloff; R. Schaefer, Dipl. - Psych. Chemistry Department: J. Weninger, OStDir. Director of Chemistry Department; W. Dierks, OStR; K.H. Gaertner, StR; H. Goke, Dipl. - Psych.; M. Lehrke, Dipl. - Psych,; H. Pfundt, StR. Biology Department: Dr. G. Schaefer, Director of Biology Department; K. Dylla, OSR.; Dr. E. Schmidt; S. Stange, Dipl. - Psych.; Educational Department: Dr. L. Kotter, Director of Educational Department; M. Steller, Dipl. - Psych.

E. PROJECT SUPPORT:
1. Organizational agency: Board of the Foundation for Education in the Natural Sciences.
2. Funding agency: Foundation for Education in the Natural Sciences.

F. PROJECT HISTORY:
1. Principal originator: German Association of The Technical Natural Science Unions.
2. Date and place of Initiation: January 1965; Kiel.
3. Overall project purpose: Research on science education.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:
1. Investigation and amelioration of science education in the Gymnasium (pupils aged 14-19).
2. Investigation of the training and amelioration of the continued education of the teachers of natural sciences.
3. Development and try-out of new courses in physics, chemistry and biology starting with 5th classes (pupils aged 10 years) in the Gymnasium, Realschule and Hauptschule.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, Lectures.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: See H. 3.

K. MATERIALS PRODUCED:

1. Physics Department:
   (a) Complete materials for the course in the 5th school year will be published in the next months.
   (b) A summary outline of the planned course for the 5th to 10th schoolyear is set up.
   (c) Materials for the 5th, 6th and 7th classes are in development at this date.

   All these materials are available in preliminary form and limited number from the Institute (see B).
2. Chemistry Department:
   (a) A general information paper about the development of teaching materials is available from the Institute. Complete materials will become available step by step next year.
3. Biology Department:
   (a) A new apparatus for the representation of neural networks has been developed and will become purchasable next month.
   (b) Materials for a biology course starting with the 5th class are in development.

L. MATERIALS AVAILABLE FREE: See K.

M. MATERIALS PURCHASABLE: See K.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: German.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: See K.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: None.
2. Total number of teachers using any of the materials: 80.
3. Total number of students using any of the materials: 4,500.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: Hebbelschule, Kiel; Friedensschule, Munster; Matthias Claudius-Schule, Pinneberg; Winfried-Gymnasium, Fulda; Staatliches Gymnasium, Kiel-Wellingdorf.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: The teachers using our materials are participants of the development and therefore are in continuous contact with the Institute. For other teachers, we organize consultations as required.

2. Activities conducted for pre-service and in-service teacher training: In a limited range, we participate in training of physics teachers at the University of Kiel. Now and then, in-service teacher training courses are organized in cooperation with the University and the Ministry of Education. They are financed by the Ministry.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies: None at this date.

3. Brief abstract of in-house or unpublished research: Not possible at this date.

4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY:

1. Hecht, Karl: Institut fur die Padagogik der Naturwissenschaften an der Christian-Albrechts-Universitat in Kiel MNU 19, S. 82-83, 1966/67.

2. Weninger, J. und Dierks, W.: Die Notwendigkeit des Unterstufen-Unterrichts in Physik und Chemie MNU 22, S. 334, 1969.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Starting of the development of teaching materials for natural sciences; see above.

V. PLANS FOR THE FUTURE: Continuation of the started activities, especially of teaching materials.

A. PROJECT TITLE: MATHEMATIK IN DER GRUNDSCHULE (MATHEMATICS IN ELEMENTARY SCHOOLS).

B. PROJECT DIRECTOR: Dr. Arnold Fricke, Professor, 33 Braunschweig, im Gettelhagen 96, Germany. 0531-372283.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. Heinrich Besuden, Professor, 29 Oldenburg, Elchweg 6, Germany. 0441-55703.
2. Special facilities or activities available for visitor viewing: a. Audio-visual aids: film presentation showing children in the 1st - 4th grade at work. b. tape recordings and records from classroom instruction. c. slides with commentary on tape.

D. PRINCIPAL PROFESSIONAL STAFF: Helmut Baars, Rektor; Dr. Heinz Schwartze, Professor; Gunter Wilde, Rektor.

E. PROJECT SUPPORT:
1. Organizational agencies: None.
2. Funding agencies: None.

F. PROJECT HISTORY:
1. Principal originator: Professor Dr. Arnold Fricke.
2. Date and place of Initiation: 1965; Braunschweig.
3. Overall project purpose: Innovation of modern mathematics in elementary schools.

G. PRESENT COMMERCIAL AFFILIATIONS: Ernst Klett Verlag, 7 Stuttgart, Postfach 809, Germany.

H. PROJECT OBJECTIVES: Based on the psychology of Jean Piaget, this course tries to develop mathematical thinking in its composite, associative and reversible aspects. This project attempts to introduce modern subject matters through the "operative method" (Fricke). The colored rods of Cuisenaire are used.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures in classrooms, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics, grade 1 - 4, age 6 - 10.

K. MATERIALS PRODUCED:
"Mathematik in der Grundschule"
1. 1651 volume 1.
2. 16511 workbook.
3. 16519 teacher's manual.
4. 16591 teacher's volume.
5. 1652 volume 2.

6. 16521 workbook I.
7. 16522 workbook II.
8. 16529 teacher's manual.
9. 1653 volume 3.
10. 16531 workbook I.
11. 16532 workbook II.
12. 16539 teacher's manual.
13. 1654 volume 4.
14. 16541 workbook I.
15. 16542 workbook II.
16. 16549 teacher's manual.
17. 16534 colored rods (for students)
18. 99311 colored stripes (demonstration).

Slides with commentary on tape.
1. 16311 1 and 2 unit.
2. 16312 3 and 4 unit.
3. 16313 5 and 6 unit.

Records from classroom work.
1. 16581

Information folders.
1. KB 10.
2. KB 13.
3. B-KB 15.

L. MATERIALS AVAILABLE FREE:
1. Teacher's manuals 16519, 16529, 16539, 16549.
2. Records from classroom work 16581.
3. Information folder's KB 10, KB 13, B-KB 15.

Available from: Ernst Klett Verlag, 7 Stuttgart 1, Postfach 809.

M. MATERIALS PURCHASABLE:

1.	1651	$ 1.80
2.	16511	.45
3.	16591	3.00
4.	1652	1.30
5.	16521	.50
6.	16522	9.50
7.	1653	1.45
8.	16531	.50
9.	16532	.50
10.	1654	1.45
11.	16541	.50
12.	16542	.50
13.	16534	1.80
14.	99311	14.50
15.	16311	60.00
16.	16312	60.00
17.	16313	60.00

Available from: Ernst Klett Verlag, 7 Stuttgart 1, Postfach 809.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: German.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: French, Spanish, Dutch.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Mathematics for the promotional stage (5th and 6th grades).

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 7,000.
2. Number of students involved: 200,000.
3. Number of schools involved: 3,000.
4. Total number of teachers using any of the materials: 8,000.
5. Total number of students using any of the materials: 230,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated, but based on the number of books sold.
7. Name and location of selected schools where the course is being taught: Almost all elementary schools in Braunschweig, Oldenburg and Wilhelmshaven. f.e. Wallschule, Oldenburg; Hermann-Ehlers-Schule, Oldenburg.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Teacher's manuals, tape recordings, slides and records only.
2. Activities conducted for pre-service and in-service teacher training: a. Lecturers and classes in college. b. Speeches and discussions (financed by PTA or Publisher). c. Two weeks courses, summer school and evening courses (financed by government).
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Articles published in professional journals; slides with commentary on tape.

S. PROJECT EVALUATION: Evaluation was carried out by project staff.

T. PROJECT PUBLICITY:
1. Fricke/Besuden: Mathematik, Elemente einer Didaktik und Methodik, Der Unterricht in der Grundschule, Ernst Klett Verlag, Stuttgart 1970.
2. Arnold Fricke: Die Rechenstabe von Cuisenaire, in: Die Deutsche Schule, Heft 3, 1970.
3. Heinrich Besuden: Farbige Stabe als Arbeitsmittel im Mathematikunterricht der Grundschule, in: Unterricht heute, 3/1970.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. **PLANS FOR THE FUTURE:** Mathematics for the promotional stage (5th and 6th grades). To be published in 1970, 1971 respectively.

A. PROJECT TITLE: NATURWISSENSCHAFTLICHER UNTERRICHT IN DER GRUNDSCHULE (NUG) (SCIENCE TEACHING IN THE ELEMENTARY SCHOOL).

B. PROJECT DIRECTOR: Dr. K. Spreckelsen, Professor, Lehrstuhl fuer Didaktik der Physik, Paedagogische Hochschule Konstantin-Uhde-Strasse 16, 33 Braunschweig, West Germany. Telephone: 0531-30885.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Visitor is welcome to discuss project activities with staff members and to look at the materials produced.

D. PRINCIPAL PROFESSIONAL STAFF: K. Spreckelsen, Director; B. Beens, W. Peisker, Staff Assistants; R. Hample, Consultant.

E. PROJECT SUPPORT:
1. Organizational agency: Paedagogische Hochschule Niedersachsen, Abteilung Braunschweig.
2. Funding agency: Diesterweg-Verlag, Frankfurt.

F. PROJECT HISTORY:
1. Principal originator: K. Spreckelsen.
2. Date and place of Initiation: February 1969; Braunschweig.
3. Overall project purpose: The reform of the so-called "Sachunterricht" of the German elementary school.

G. PRESENT COMMERCIAL AFFILIATIONS: Diesterweg-Verlag, Hochstrasse 29-31, 6 Frankfurt, West Germany.

H. PROJECT OBJECTIVES: In Germany there has been until recently science teaching in the elementary school without any conceptual scheme. The NUG-project is the first attempt to construct a science curriculum for the German elementary school including the conceptual frame of "structure of the discipline". The project combines both content and process approach. In the content dimension the first grade unit is concerned with properties of solids, liquids and gases; in the process dimension, the first grade unit is aimed at the objectives, observing, classifying and comparing (measuring). We aim at the development of very detailed teachers' guides in order to permit every elementary school teacher to implement the course in his own classroom.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups, Use of concrete materials in order to encourage abstraction process.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Elementary science (particularly physics and chemistry); grades 1-4;

age 6 through 10; all ability levels.

K. MATERIALS PRODUCED:
1. Diesterweg-Information Grundschule 1 (announcement and overall description of the project).
2. Stoffe und ihre Eigenschaften (First grade, teachers' guide, preliminary version).

L. MATERIALS AVAILABLE FREE:
Item 1, from: Lehrstuhl fuer Didaktik der Physik, Paedagogische Hochschule, Konstantin-Uhde-Strasse 16, 33 Braunschweig, West Germany.

M. MATERIALS PURCHASABLE:
Item 2, from: Diesterweg-Verlag (Mrs. A. Quehl), Hochstrasse 29 - 31, 6 Frankfurt, West Germany.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: German.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION: First grade only.
1. Number of teachers who have adopted the entire course: More than 50.
2. Number of students involved: More than 1500.
3. Number of schools involved: About 40.
4. Total number of teachers using any of the materials: Unknown.
5. Total number of students using any of the materials: Unknown.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Berlin, Duesseldorf, Frankfurt, Hamburg, Heidelberg, Muenchen. For further information write project headquarters.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: The project staff and some college personnel visit classrooms, advise on facilities, conduct evaluation and consult on matters of concern to a teacher.
2. Activities conducted for pre-service and in-service teacher training:
    (a) Pre-service teacher training at Paedagogische Hochschule.
    (b) As to in-service teacher training see H.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? The effectiveness of our materials is being evaluated at the moment by project staff.

2. Pertinent published research studies: Not yet published.

3. Brief abstract of in-house or unpublished research: Not answered.

4. Additional evaluative data available to interested individuals: None, as yet.

T. PROJECT PUBLICITY: None published.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:
Development and field-testing of further material for grades 2-4.

A. PROJECT TITLE: ELEMENTARY SCIENCE SCHEME.

B. PROJECT DIRECTOR: S. M. Adu-Ampoma, Principal Education Officer (Science), Ministry of Education, P. O. Box M-188, Accra, Ghana.

C. PROJECT HEADQUARTERS:

1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: A science workshop, improvised pieces of apparatus for teaching science in elementary schools, books for pupils and teachers.

D. PRINCIPAL PROFESSIONAL STAFF: S. M. Adu-Ampoma, Principal Education Officer; Miss Margaret Tawia, Senior Education Officer; Dr. Jim Seawell, American Technical Assistance; Steve Manning; 4 Science Organizers; 2 Technicians.

E. PROJECT SUPPORT:

1. Organizational agencies: Educational Development Centre, U.S.A.; Ministry of Education, Accra, Ghana.
2. Funding agencies: Educational Development Centre, funds, personnel and equipment; UNICEF, supplies, equipment and funds for in-service courses; Ministry of Education, Accra, Ghana.

F. PROJECT HISTORY:

1. Principal originator: Ministry of Education, Accra, Ghana.
2. Date and place of Initiation: 1962, Middle School Science Scheme; Saltpond and Accra, Ghana. 1965, APSP.
3. Overall project purpose: Introducing "Science by Discovery" into the curriculum of the elementary schools.

G. PRESENT COMMERCIAL AFFILIATIONS: Education Development Centre, Newton, Mass., U.S.A.; MacMilan & Co., London - Workbooks and Teacher's Books.

H. PROJECT OBJECTIVES:

1. Discovery approach is stressed rather than giving information.
2. Local materials are used for making improvised apparatus as much as possible.
3. The scope is greater and much more comprehensive than mere Nature Study and Hygiene - this is General Science based on the circumstances and environment in Ghana.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Seminars for tutors and teachers, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Lower Primary - Introductory Activities e.g. Woodworking, Art and Craft, etc. Upper Primary - Units e.g. Bulbs and Batteries, Buds and Twigs. Middle and Continuation - experimentation using Workbooks.

K. MATERIALS PRODUCED:
1. Units - about 70 or more produced by the African Primary Science Programme.
2. Experimental Science for Elementary Schools Books 1, 2, 3, and 4 with Teachers' Books (MacMillan).
3. A First Handbook of Science Activities for Teachers (Mac Millan).

L. MATERIALS AVAILABLE FREE: Units may be given free if not asked for in large numbers from The Education Development Centre, Newton, Mass. Workbooks from MacMillan, London at stated prices.

M. MATERIALS PURCHASABLE:

1. A First Handbook of Science Activities	17/6 U.K.
2. Experimental Science for Elementary Schools	
Book 1	12/6
Book 2	17/6
Book 3	12/6
Book 4	12/6
3. Teachers Books 1 and 2	4/6
Book 3	4/6
Book 4	4/6

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: More Units, Teacher's Books, Library or Background Readers.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: About 700-800.
2. Number of students involved: 18,000 - 20,000.
3. Number of schools involved: 400.
4. Total number of teachers using any of the materials: 700-800.
5. Total number of students using any of the materials: 18,000 - 20,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where course is being taught: Primary and Middle Schools in all the Regions of Ghana.

R. **TEACHER PREPARATION:**

1. Consultant services available for teachers using the materials: In-service courses; Visits and supervision by Regional Science Organizers and the Staff of the Curriculum and Research Unit of the Ministry of Education, Science Section.
2. Activities conducted for pre-service and in-service teacher training: Briefing courses, workshops for practicing teachers and training College Science Tutors - $4,000 each; Week-end courses - $100.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Units, Workbooks, Local materials about $1,000 worth for each workshop e.g. batteries, locally available chemicals e.g. CUSOU wood, nails, etc.

S. **PROJECT EVALUATION:**

1. Has the effectiveness of the materials been evaluated? Yes, by Educational Development Center.
2. Pertinent published research studies: Educational Development Center, Evaluation studies by Eleanor Duckworth.
3. Brief abstract of in-house or unpublished research: Questionnaire for teachers re. themselves; Questionnaire for teachers re. pupils.
4. Additional evaluative data available to interested individuals: Document on Evaluation by Tunde, available from Educational Development Center; our own questionnaires described in 3 above are obtainable.

T. **PROJECT PUBLICITY:**

1. Ghana Journal of Education obtainable from Ministry of Education, Accra.
2. Various Educational Development Center publications especially the Monthly Reports.

U. **BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:** Trying out units in schools; involving the Training Colleges in the scheme.

V. **PLANS FOR THE FUTURE:**

1. January 4-14th Workshop for Teachers and Tutors.
2. March - Regional Workshop in Ashanti Region.
3. Weekend Courses.

A. PROJECT TITLE: JOINT SCHOOLS PROJECT (J.S.P.).

B. PROJECT DIRECTOR: M.C. Mitchelmore, General Editor, P.O. Box 62, Legon, Ghana.

C. PROJECT HEADQUARTERS:
1. Contact: The Secretary (J.S.P.), P.O. Box 62, Legon, Ghana.
2. Special facilities or activities available for visitor viewing: By arrangement.

D. PRINCIPAL PROFESSIONAL STAFF: M.C. Mitchelmore, General Editor; B. Raynor, Revision Editor.

E. PROJECT SUPPORT:
1. Organizational agencies: University of Ghana; Ministry of Education, Accra.
2. Funding agencies: Nuffield Foundation, C.R.E.D.O., British Ministry of Overseas Development.

F. PROJECT HISTORY:
1. Principal originators: Eight teachers from three schools in Ghana, working as a sub-committee of the Mathematical Association of Ghana.
2. Date and place of Initiation: February 1964; Achimota School, Ghana.
3. Overall project purpose: To produce a "new math" course for secondary schools in West Africa, up to school certificate level.

G. PRESENT COMMERCIAL AFFILIATIONS: Langman Group Ltd., publish trial and permanent editions of the textbooks.

H. PURPOSES AND OBJECTIVES: The aim is to produce a mathematics course for secondary schools in West Africa, up to the present 'O' level. This course is to be:
1. Founded on practical work, to make up for a lack of opportunity for such experience in students' cultural and educational background.
2. Relevant to their surroundings and future needs, to encourage learning by understanding rather than by rote.
3. An intuitive development, since experience has shown that over-emphasis on logic kills all interest and hinders progress.
4. Modern, where modern topics help to attain the aims of a-c.
The course will be at two levels: Basic - for those students who will do no more mathematics after 'O' level; Special - for those who will specialize in science subjects after 'O' level. This project differs from similar projects by placing much more emphasis on how mathematics arises naturally in the environment and how it can be applied in various situations, than on the logical structure of mathematics itself. The

originators of the project felt that this approach would prove to be much more valuable for the average secondary school student in Ghana.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Class teaching based on the "discovery approach".

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics; grades 7-11; ages 12-16, all ability levels.

K. MATERIALS PRODUCED:
1. Textbook 1, Workbook 1 and Teacher's Guide 1 (Permanent edition).
2. Textbook 2, Workbook 2 and Teacher's Guide 2 (Permanent edition).
3. Textbook 3, Workbook 3 and Teacher's Guide 3 (Permanent edition).
4. Textbook 4 (Basic course), two parts (Final edition).
5. Textbook 4 (Special course), three parts (Final edition).
6. Textbook 5 (Basic course), two parts (Final edition).
7. Textbook 5 (Special course), two parts (Final edition).
8. J.S.P. Report.

L. MATERIALS AVAILABLE FREE:
Item 8 from project headquarters.
Items 4-7 on application to publisher.

M. MATERIALS PURCHASABLE:
Items 1-3 available through booksellers, cost: Textbook 1: 10s, Textbook 2: 11s, Textbook 3: 11s, Workbooks: 4s, Teacher's Guides: 15s.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: See V.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: Not applicable.
2. Total number of teachers using any of the materials: About 100.
3. Total number of students using any of the materials: About 8,000.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: Achimota School, Ghana; St. Anne's College, Ibadan; Wesley Secondary School, Segbwema, S. Leone; Knox College, Jamaica; Munali Secondary School, Zambia.

R. TEACHER PREPARATION:

1. Consultation services available for teachers using the materials: J.S.P. editors are always available for consultation.

2. Activities conducted for pre-service and in-service teacher training: In Ghana, in-service courses are provided in conjunction with the Mathematical Association of Ghana. Usually two two-week sessions per year are financed by the Ministry of Education, Accra. Similar arrangements are carried out in other countries.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated: Yes, by project staff.

2. Pertinent published research studies: Not answered.

3. Brief abstract of in-house or unpublished research: Not answered.

4. Additional evaluative data available to interested individuals: Not answered.

T. PROJECT PUBLICITY: Not answered.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Completion of preliminary texts and first revised editions; permanent editions of Books 2 and 3.

V. PLANS FOR THE FUTURE: Completion of permanent editions of Books 4, 4S, 5, 5S. Preparation of special editions for the Caribbean and for Central Africa.

A. PROJECT TITLE: THE SIXTH FORM MATHEMATICS PROJECT GROUP (SFMPG).

B. PROJECT DIRECTOR: Dr. E.M. Hartley, Chairman SFMPG, Mathematics Department, University of Ghana, P.O. Box 62, Legon, Ghana.

C. PROJECT HEADQUARTERS:
1. Contact: Mr. B.A. Eshun, P.O. Box 101, Cape Coast, Ghana. (up to June 1970, Mr. C.J. Fletcher, same address).
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. E.M. Hartley, Acting Head of Mathematics Department, University of Ghana; Mr. J.B. Ofosu, Mathematics Department, University College of Cape Coast; Mr. T.J. Powell, Educational Department, University College of Cape Coast; Messrs., Burrow, Fletcher, Goodfellow, Onyett, Thompson, White - school teachers.

E. PROJECT SUPPORT:
1. Organizational agency: None.
2. Funding agencies: The School Mathematics Project, Westfield College, Kidderpore Avenue, London N.W. 3, England.

F. PROJECT HISTORY:
1. Principal originators: Teachers in schools in Ghana.
2. Date and place of Initiation: January 1969; Ghana.
3. Overall project purpose: Preparation of a new series of student mathematics texts leading from any mathematical background in grades 7-11 (British system: secondary school forms 1 to 5), to cover an advanced course in 'modern' mathematics in grades 12 & 13 (British: forms Lower and Upper 6th).

G. PRESENT COMMERCIAL AFFILIATIONS: Cambridge University Press, England.

H. PROJECT OBJECTIVES: To be particularly relevant in Anglophone West Africa, where a new syllabus for Mathematics in the public examinations ("Advanced Level") has recently been introduced. This is taken by students at the end of "Upper Sixth" (grade 13). It differs from other projects in:
1. Being intended for countries in which English is a second language rather than a mother tongue, and where the culture is not European.
2. Not presuming a background in modern mathematics. This meets the need in West Africa, where students frequently transfer from one secondary school to another after the end of Form 5 (grade 11): some will have followed a 'modern' course in grades 7-11, others will not.
The final text will rely heavily on already published texts of SMP Advanced Mathematics, details in M, below.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Student text as a back-up to teaching by a teacher.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics; grades 12-13; ages 16-20; high ability levels.

K. MATERIALS PRODUCED:
1-4. SMP Advanced Mathematics, books 1-4 (produced by The School Mathematics Project, but basic to this Project).
5. Sixth Form Mathematics Project, supplementary book 1 (relates to material contained in 1 & 2).
6. Annual Report of the Sixth Form Mathematics Project Group.

L. MATERIALS AVAILABLE FREE:
Item 6: Dr. E.M. Hartley, P.O. Box 62, Legon, Ghana.

M. MATERIALS PURCHASABLE: Items 1-4 can be obtained from: Cambridge University Press, 200 Euston Road, London N.W. 1, or 32 East 57th Street, New York 10022.
1: Sterling L1.05
2: Sterling L1.25
3: Sterling L1.25
4: Sterling L1.25
5: Sterling L0.25 or $0.50, Dr E.M. Hartley, P.O. Box 62, Legon, Ghana.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
1. Supplementary Book 2: refers to contents of items 3, 4.
2. A final text consisting of a series of three student volumes, title not yet decided, based on items 1-5 and supplementary book 2.

Q. PROJECT IMPLEMENTATION: This is at a Trial Stage only at present.
1. Number of teachers involved: 16.
2. Number of students involved: 150.
3. Number of schools involved: 10.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated (about half in each case are actively involved, in the sense of expected to return comments on materials in use).
5. Name and location of selected schools where the course is being taught: Mfantsipim School, P.O. Box 101, Cape Coast, Ghana; Prempeh College, P.O. Box 1993, Kumasi, Ghana; Achimota School, P.O. Box 11, Achimota, Ghana.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Arranged through annual conferences for teachers of this level of work, at which a visiting lecturer from Britain is usually present.

2. Activities conducted for pre-service and in-service teacher training: See 1.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies: None.

3. Brief abstract of in-house or unpublished research: None.

4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY:

1. Mathematical Association of Ghana Journal, number 10.

2. School Mathematics Project, Director's Report 1968/69.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

1. September 1970: Publish supplementary book 2.

2. September 1970: Produce revised draft of first volume of the planned student text series.

3. June - December 1971: Draft second volume.

4. January 71 - June 1971: Draft third volume.

5. May 1971: First volume to be published by Cambridge University Press.

6. June - December 1970: Planning and writing conferences.

A. PROJECT TITLE: CONTEMPORARY SCHOOL MATHEMATICS (C. S. M.) ST. DUNSTAN'S COLLEGE SYLLABUS.

B. PROJECT DIRECTOR: Alan J. Sherlock, St. Dunstan's College, Catford, London S. E. 6. 01-690-1562

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Visitors are always welcome to visit classes.

D. PRINCIPAL PROFESSIONAL STAFF: T. E. Brand, H. D. Ellerby, T. G. Pratt, D. A. Holland, D. B. Thomson.

E. PROJECT SUPPORT:
1. Organizational agency: Secretarial assistance is provided by Edward Arnold (Publishers) Ltd.
2. Funding agency: None.

F. PROJECT HISTORY:
1. Principal originators: Professor Geoffrey Matthews, now Professor of Mathematics Education, Chelsea College of Science & Technology, University of London; C. A. R. Bailey, now Principal Lecturer In Mathematics at Newton Park Teachers' Training College, Bath; F. B. Lovis, now Principal Lecturer in Mathematics at Leicester Teachers' Training College; A. J. Sherlock; J. A. C. Reynolds, Head of Physics Department, St. Dunstan's College.
2. Date and place of Initiation: About 1960; St. Dunstan's College.
3. Overall project purpose: There are many reasons for the introduction of new topics although basically we believe that mathematics today should be relevant to the world today, hence computers, sets & logic (Boolean algebra, switching circuits), matrices and statistics.

G. PRESENT COMMERCIAL AFFILIATIONS: All work is being published by Edward Arnold (Publishers) Ltd., 41 Maddox Street, London W. 1.

H. PROJECT OBJECTIVES: To give the children an awareness of the basic structure of mathematics and also to find (and apply) mathematics in the world in which the children live. Unique characteristics - Apart from isolated topics, the syllabus differs in that: a. the structure of mathematics (e.g. groups) is a central recurring theme; b. matrices are given a place of importance (from the start); c. computers are investigated, not only the logic of the computer but also the 'hardware' is discussed; d. two-thirds of the syllabus is of traditional material (including Euclidian Geometry) treated with an up-to-date approach.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Lectures, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics for ages 11-16 and for ages 16-18, for students of high ability.

K. MATERIALS PRODUCED:

1. Matrices I. G. Matthews.
2. Sets & Logic I. C. A. R. Bailey.
3. Computers I. F. B. Lovis.
4. Shape, Size & Place. J. A. C. Reynolds.
5. Matrices II. G. Matthews.
6. Sets & Logic II. C. A. R. Bailey.
7. Computers II. F. B. Lovis.
8. An Introduction to Probability & Statistics. A. J. Sherlock.
9. Mathematics I. H. D. Ellerby and A. J. Sherlock.
10. Mathematics II. H. D. Ellerby and A. J. Sherlock.
11. Mathematics III. T. E. Brand, D. W. M. Wade, and A. J. Sherlock.
12. Mathematics IV. T. E. Brand, D. W. M. Wade, and A. J. Sherlock.
13. Geometry & Logic. C. A. R. Bailey.
14. Exercises I. H. D. Ellerby, M. G. Phillips and T. E. Brand.
15. Exercises II. T. E. Brand and D. W. M. Wade.

For ages 16 - 18.

A. Matrices: Pure and Applied. T. E. Brand and A. J. Sherlock.
B. Analogue Computers. M. J. D. Brand and T. E. Brand.

L. MATERIALS AVAILABLE FREE: Publicity brochure from publishers: Edward Arnold (Publishers) Ltd., 41 Maddox Street, London W.1.

M. MATERIALS PURCHASABLE: All from Edward Arnold (Publishers) Ltd., 41 Maddox Street, London W. 1.

Items 1-8	5/- each.
Item 9	15/- each.
Item 10	12/6d each.
Item 11	15/- each.
Item 12	20/- each.
Item 13	6/- each.
Item 14	7/6d each.
Item 15	10/6d each.
Item A	24/- each.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Spanish, Italian, (Czech, Hungarian & Tamil under consideration). Local editions are being prepared in Singapore and South Africa.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Unknown.
2. Number of students involved: Booklets (i.e. 1-8) have sold over 50,000 each, the course books (9-12) about 12,000.
3. Number of schools involved: Over 140.
4. Number of teachers using any of the materials: Unknown.
5. Are the totals stated in 1, 2, 3 and 4 estimated or definitive? Estimated.
6. Name and location of selected schools where the course is being taught: St. Dunstan's College, Catford, London S. E. 6; Prendergast Grammer School for Girls, London S. E. 6.; Sir Joseph Williamson's Mathematical School, Rochester, Kent.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Information is readily available from St. Dunstan's College.
2. Activities conducted for pre-service and in-service teacher training: Frequent lectures are given to teachers regarding the content of the syllabus.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION: Not answered.

T. PROJECT PUBLICITY:

National Press:

"What the New Teaching is About"	Daily Telegraph 13-8-69.
"What is the New Mathematics?"	Observer 15-1-67.

Mathematical Gazette, Mathematics Teaching, A. M. A. Journal, Technical Education Oct. '68 (Reviews).
Times Educational Supplement 2-5-64, 7-5-65, 28-4-67 (Reviews).
Mathematics Projects in British Secondary Schools (from Maths. Association).
Matematika ve Skole. 1969 (Czechoslovakia publication).

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Completion of Mathematics IV, Matrices: Pure and Applied, and Analogue Computers.

V. PLANS FOR THE FUTURE: Further experimental sixth form texts are in production. These are: Introduction to Operational Research and Vectors: Pure and Applied. A Statistics text and one on algebraic structure are also planned.

A. PROJECT TITLE: MATHEMATICS IN EDUCATION AND INDUSTRY (M.E.I.).

B. PROJECT DIRECTOR: S.L. Parsonson, 57 High Street, Harrow Hai 3HT, Great Britain. Telephone: 01-422-5267.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: All members of this Project are serving schoolmasters.

E. PROJECT SUPPORT:
1. Organizational agency: Industrial Committee of the Mathematical Association of Great Britain.
2. Funding agencies: B.P. - Shell - Mex.

F. PROJECT HISTORY:
1. Principal originator: B.T. Bellis.
2. Date and place of Initiation: 1962; London.
3. Overall project purpose: To effect liaison between industry and education. Syllabuses developed in the light of experience gained.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: See F3. Various M.E.I. groups have been established around the country and links with local industries forged. Advanced level examination syllabuses have been introduced, with emphasis on probability, linear algebra and numerical methods. There is much emphasis on computers and computing in the work of M.E.I.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Normal school-teaching methods.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics; A/S levels (with an additional mathematics examination at O level), roughly 15+ years.

K. MATERIALS PRODUCED:
1. Vectors, Matrices and Linear Equations by Neill & Moaker, (Oliver and Boyd).
2. Problems in Computing by Goldstein (Oliver and Boyd).
3. Practical Introduction to Statistics, by A.J. Malpas (Oliver and Boyd).
4. Pure Mathematics, Vol. I, by S.L. Parsonson (Cambridge University Press).
5. Syllabus for M.E.I. A/S levels.
6. M.E.I. A/S levels for 1969.

L. **MATERIALS AVAILABLE FREE:** None.

M. **MATERIALS PURCHASABLE:** Items 1, 2, 3 from publisher. Items 4 and 5, from project director; cost 5s.

N. **LANGUAGE IN WHICH MATERIALS WERE WRITTEN:** English.

O. **LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED:** None.

P. **ADDITIONAL MATERIALS BEING DEVELOPED:** None.

Q. **PROJECT IMPLEMENTATION:**
1. Number of teachers who have adopted the entire course: Estimated 200.
2. Number of students involved: Estimated 2,000.
3. Number of schools involved: Estimated 50.
4. Total number of teachers using any of the materials: Unknown.
5. Total number of students using any of the materials: Unknown.
6. Name and location of selected schools where the course is being taught: London Area: Marrow School, St. Paul's; West Country: Clifton College; Scotland: Daniel Stewart's.

R. **TEACHER PREPARATION:**
1. Consultant services available for teachers using the materials: None.
2. Activities conducted for pre-service and in-service teacher training: A course has recently been held at the Center for Scientific Education at Chelsea (8, non-residental).
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. **PROJECT EVALUATION:** Materials have not been evaluated.

T. **PROJECT PUBLICITY:**
1. Industrial Reports of the Mathematical Association, 1966, 1969.
2. Mathematics Projects in British Secondary Schools (Bell & Son), 1968.

U. **SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:** Not answered.

V. **PLANS FOR THE FUTURE:** We envisage a considerable expansion of numbers taking M.E.I. examinations over the next five years. Further books are being written and should be published in the period 1971-73.

A. PROJECT TITLE: NUFFIELD A-LEVEL BIOLOGICAL SCIENCE PROJECT.

B. PROJECT DIRECTOR: P.J. Kelly, Centre for Science Education, Chelsea College, University of London, Bridges Place, London S.W. 6, England. Telephone: 01-736-3401. W.H. Dowdeswell, School of Education, Bath University of Technology, Bath, England.

C. PROJECT HEADQUARTERS:
1. Contact: Mr. Kelly.
2. Special facilities or activities available for visitor viewing: Yes, on request.

D. PRINCIPAL PROFESSIONAL STAFF: Not answered.

E. PROJECT SUPPORT:
1. Organizational agency: Chelsea College, University of London.
2. Funding agency: Nuffield Foundation.

F. PROJECT HISTORY:
1. Principal originator: Nuffield Foundation.
2. Date and place of Initiation: January 1965; London.
3. Overall project purpose: To improve biological education for pupils of 16-18 years of age in British schools.

G. PRESENT COMMERCIAL AFFILIATIONS: Penguin Books Ltd., Harmondsworth, Middlesex, England.

H. PROJECT OBJECTIVES:
1. To develop in students the intellectual and practical abilities which are fundamental to the understanding of biological science.
2. To introduce students to a body of biological knowledge through investigating living things and studying the work of scientists. In doing so, students consider the process of research and the implications of biological science for society.
3. To develop in students the facility for independent study especially how to learn through critical evaluation rather than by rote.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction (adopted), Laboratory investigations, Lectures, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Biological Science in sixth forms of British schools.

K. **MATERIALS PRODUCED:**

For Students:

Laboratory Guides:	Maintenance of the Organism. Organisms and Populations. The Developing Organism. Control and Coordination in Organisms.
Study Guide:	Evidence and Deduction in Biological Science.
Topic Reviews:	About 15 titles. Those completed at the time of writing are: The Heart-Lung Machine. The Artificial Kidney. Circulation. Metabolism. Interactions. Control of Breathing. Photosynthesis. Biological Barriers. Human Pregnancy and Birth. From Egg to Adult. Thinking Quantitatively I - Descriptions and Models. Thinking Quantitatively II - Statistics and Experimental Design.

For Teachers:

Teachers' Guide I:	(For Laboratory Guides) Maintenance of the Organism. Organisms and Populations.
Teachers' Guide II:	(For Laboratory Guides) The Developing Organism. Control and Coordination in Organisms.
Teachers' Guide III:	(For Study Guide) Evidence and Deduction in Biological Science.

Laboratory Book.

Projects in Biological Science.

Film Loops: 8mm available in several titles in standard-8 or super-8.

L. **MATERIALS AVAILABLE FREE:** Pamphlets: 'Objectives, Outline Scheme and Examinations', 'Starting Nuffield A-level Biological Science'.

M. MATERIALS PURCHASABLE: Details from: Penguin Books Ltd., Harmondsworth, Middlesex, England.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. MATERIALS BEING DEVELOPED: Details available from Project Director.

Q. PROJECT IMPLEMENTATION: Details available from Project Director.

R. TEACHER PREPARATION: Details available from Project Director.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies:
   (a) Eggleston, J.F. and Kelly, P.J., "The Assessment of Attainment in Project Work for A-level Biology", Educational Research, 12, 2, 1960.
   (b) Kelly, P.J. and Lister, R.E., "Assessing Practical Ability in Nuffield A-level Biology", Studies in Assessment (Editors J.F. Eggleston and J.F. Kerr) E.U.P., 1969.
3. Brief abstract of in-house or unpublished research: Details available from project director.
4. Additional evaluative data available to interested individuals: Details from project director.

T. PROJECT PUBLICITY:
1. "Nuffield A-level Biology Project", Journal of Biological Education, 1, 1967.
2. "Nuffield A-level Biology Project", Education in Science, April 1967.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Tested materials available for distribution in April 1970.

V. PLANS FOR THE FUTURE: Details from project director.

A. PROJECT TITLE: NUFFIELD COMBINED SCIENCE PROJECT.

B. PROJECT DIRECTOR: M.J. Elwell, City of Birmingham, College of Education, Westbourne Road, Birmingham 15, United Kingdom.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Discussion, viewing of apparatus and materials by arrangement with director.

D. PRINCIPAL PROFESSIONAL STAFF: C.D. Bingham, Joint Organizer (Consultant 1966-69); J. Lance, Team Member; K. Wild, Team Member.

E. PROJECT SUPPORT:
1. Organizational agency: Nuffield Foundation.
2. Funding agency: Nuffield Foundation.

F. PROJECT HISTORY:
1. Principal originators: M.J. Elwell, C.D. Bingham.
2. Date and place of Initiation: September 1965; Birmingham, U.K.
3. Overall project purpose: To produce a source of materials for children and their teachers to work on a combined rather than separate subject approach to experience in science.

G. PRESENT COMMERCIAL AFFILIATIONS: Longman Group/Penguin.

H. PROJECT OBJECTIVES: To produce materials adaptable over the whole range of ability in the 11 to 13 year age range, so that children are actively engaged in the laboratory, gaining as much experience as possible of science as a method of inquiry and appreciating the consistency of outlook of science, the process of hypothesis formation and testing, and the need for developing concepts to be used in explaining their observations. To produce materials which would enable teachers to work with confidence over a wider front than they might normally experience.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science; about 11 to 13 year age range; all abilities.

K. MATERIALS PRODUCED:
1. Teacher's Guides I & II, contain material for the ten sections of work into which Combined Science is divided.
2. Activities 1 & 2, contain 5 separate booklets in each covering the corresponding work for children - they are not text books.

3. 8mm film loops.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: All the items in K will be published during 1970 and up-to-date information can be obtained from Longman Group/Penguin.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not known.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION: Answers refer only to the trial schools - the take up by schools other than those is not known.
1. Number of teachers who have tried the entire course: 80.
2. Number of students involved: 4,000.
3. Number of schools involved: 38.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: Available from project director.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Access to trial teachers and team members by arrangement.
2. Activities conducted for pre-service and in-service teacher training: Courses of a fortnight's duration are held at the City of Birmingham College of Education under the direction of M.J. Elwell. The courses are residential; further information from the Principal of the College.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: See 2 above.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: None.
4. Additional evaluative data available for interested individuals: None.

T. PROJECT PUBLICITY:
"The Nuffield Combined Science Project", Education in Science, (The Bulletin of the Association for Science Education, U.K.), April 1968.

U. **SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:** **Final revision and preparation for publication.**

V. **PLANS FOR THE FUTURE:**
Continuing activities to familarize teachers with Combined Science.

A. PROJECT TITLE: **NUFFIELD FOUNDATION SCIENCE TEACHING PROJECT: ADVANCED LEVEL CHEMISTRY SECTION.**

B. PROJECT DIRECTOR: Mr. E.H. Coulson, Nuffield Science Teaching Project, Chelsea College of Science and Technology, Bridges Place, London, S.W. 6, U.K. Telephone: 01 736 3401.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: A.W.B. Aylmer-Kelly, E.H. Coulson, Dr. Erica Glynn, H.R. Jones, A.J. Malpas, Dr. A.L. Mansell, J.C. Mathews, Dr. G. Van Praagh, J.G. Raitt, B.J. Stokes, R. Tremlett, M.D.W. Vokins.

E. PROJECT SUPPORT:
1. Organizational agency: None.
2. Funding agency: Nuffield Foundation.

F. PROJECT HISTORY:
1. Principal originators: The Association for Science Education and the Nuffield Foundation.
2. Date and place of Initiation: October, 1965; London.
3. Overall project purpose: Development of teaching scheme for chemistry for the 16-18 year age group.

G. PRESENT COMMERCIAL AFFILIATIONS: Penguin Books Ltd., Horton Road, West Drayton, Middlesex.

H. PROJECT OBJECTIVES:
1. Production of an integrated course in chemistry for use with the 16-18 age group.
2. The course to be practically based and to demand maximum pupil involvement.
3. Technological application of chemical facts and principles to be stressed throughout the course.
4. The development of a system of assessment that should be in harmony with the spirit of the course.

Objectives can be found in the Teachers' Guide.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Lectures, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Chemistry; VIth Form; 16-18 years; approximately top 20% of ability range.

K. MATERIALS PRODUCED:

1. Students' Book, Volumes I and II.
2. Teachers' Guide, Volumes I and II.
3. Special Study Books:
    - (a) Biochemistry.
    - (b) Chemical Engineering.
    - (c) Food Science.
    - (d) Ion Exchange.
    - (e) Metallurgy.
4. Teachers' Guide to the Special Studies.
5. "The Chemist in Action".
6. Book of Data.
7. Programmed Texts (4).
8. Experiment sheets.
9. Overhead Projector Originals (about 120).

Publication to commence June 1970, and continue into June 1971.

L. MATERIALS AVAILABLE FREE: Free brochure giving details of publications and course to be available from Penguin Books, Ltd., Horton Road, West Drayton, Middlesex, from April 1970.

M. MATERIALS PURCHASABLE: Items 1-9. Costs not yet determined. Materials will be available through normal retail outlets.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: About 150, trial version of materials only.
2. Number of students involved: About 2,000, trial version of materials only.
3. Number of schools involved: 64.
4. Total number of teachers using any of the materials: Final material not yet available.
5. Total number of students using any of the materials: Final material not yet available.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Available on application.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: None.

2. Activities conducted for pre-service and in-service teacher training: In-service courses being arranged in collaboration with Department of Education and Science.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: All material described above.

S. PROJECT EVALUATION: No evaluation has been carried out yet.

T. PROJECT PUBLICITY:
1. Nuffield Chemistry - Professor Sir Ronald Nyholm, "Achievement and Prospect".
2. Nuffield Chemistry - E.H. Coulson, "General Survey".
3. Nuffield Chemistry - J.G. Raitt, "Special Studies".
4. Nuffield Chemistry - J.C. Mathews, "Examinations".
5. Nuffield Chemistry - M.D.W. Vokins, "Structural Chemistry".
6. Nuffield Chemistry - A.W.B. Aylmer-Kelly, "Energy, Equilibrium and Kinetics".
7. Nuffield Chemistry - Dr. A.L. Mansell, "Technology".

All in Education in Chemistry, Vol. 6, No. 6, November 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Preparing final materials for publication; administration of externally assessed examinations (in collaboration with University of London School Examinations Council).

V. PLANS FOR THE FUTURE:
1970/71: Further in-service training programmes.

A. PROJECT TITLE: NUFFIELD FOUNDATION SCIENCE TEACHING PROJECT: NUFFIELD ADVANCED PHYSICS.

B. PROJECT DIRECTOR: Joint Organisers: Dr. P. J. Black, Physics Dept., P. O. Box 363, University of Birmingham, Birmingham, England. 021-472-1301.

Mr. J. M. Ogborn, Nuffield Advanced Physics, Chelsea College, 88-90 Lillie Road, London, S. W. 6. 01-385-5506.

C. PROJECT HEADQUARTERS:

1. Contact: Mr. Ogborn.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Joint Organisers: Dr. P. J. Black and Mr. J. M. Ogborn; Full-time Staff: W. Bolton (Office), M. J. Harrap, P. R. Lawton (Evaluation); Part-time Staff: G. E. Foxcroft (Rugby School), J. Harris, R. W. Fairbrother, A. W. Mansell (Chelsea College, Centre for Science Education); A. W. Trotter (North London Science Centre).

E. PROJECT SUPPORT:

1. Organizational agency: Chelsea College, Centre for Science Education.
2. Funding agency: Nuffield Foundation.

F. PROJECT HISTORY:

1. Principal originator: Nuffield Foundation; following earlier projects.
2. Date and place of Initiation: September 1967; No specific place.
3. Overall project purpose: To produce and test materials suited to the education in physics of students aged 16 - 18 years who will be examined at the British Advanced Level General Certificate of Education.

G. PRESENT COMMERCIAL AFFILIATIONS: Publishers: Penguin Limited (no material yet published).

H. PROJECT OBJECTIVES: Project objectives given in document 'Teachers Guide, General Introduction' - an interim version of which is available from the Project Headquarters at Lillie Road.

Aims:

1. To enable students to meet more successfully the demands that will be made in future education or career on their ability to learn more physics.
2. To develop an understanding of physics at a level appropriate to the students concerned. (Understanding defined as the ability to contribute effective arguments towards the solution of problems for which the student has not been trained in complete explicit rules of solution).

3. To develop an understanding of the nature of inquiry in physics.
4. To improve the student's ability to make individual inquiries within physics.
5. That students should seek, in the future, to gain further understanding of physics.
6. That students should become more aware of the influences of physics on society and of the opportunities open to people willing to apply their knowledge towards the meeting of human needs.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Minimal - programmed instruction, Laboratory investigations, Teaching in groups of about 20, too free to call a lecture, too structured to call a discussion group.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Physics - English General Certificate of Education, Advanced level. Ages 16-18 years. Ability level approximately the top quintile.

K. MATERIALS PRODUCED: No materials yet published.

L. MATERIALS AVAILABLE FREE: Project objectives given in document 'Teachers Guide, General Introduction' - interim version available from Mr. Ogborn (address in B, above).

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: No plans so far.

P. ADDITIONAL MATERIALS BEING DEVELOPED: All materials under development, including film loops.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 141 selected for trials.
2. Number of students involved: 1600.
3. Number of schools involved: About 70.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: Visitors should contact the Project Headquarters.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Each teacher attends two one-week briefing conferences, one for each year of the course. Schools are visited about six times a year by project staff, and are organized

into regional groups. Local meetings are held under the guidance of an area representative.

2. Activities conducted for pre-service and in-service teacher training: See R.1. Finance provided by Local Education Authorities.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: No available materials, except as in H.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Evaluation is going on now, funded externally by Schools Council, organized in close liaison with Project.

2. Pertinent published research studies: None so far.

3. Brief abstract of in-house or unpublished research: Pre- and post-tests on cognitive and spatial abilities, and on attitudes. Analysis of project course tests and examinations. Pilot study of classroom observation system. Analysis of free response writing about course by students. Study of written feedback from teachers.

4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: Education in Science No. 27. April 1968. (Bulletin of Association for Science Education.)

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Further development and testing of materials.

V. PLANS FOR THE FUTURE: Material to be delivered to publisher 1970-71 for publication in 1971-72.

A. PROJECT TITLE: NUFFIELD MATHEMATICS TEACHING PROJECT.

B. PROJECT DIRECTOR: Geoffrey Matthews, 12 Upper Belgrave Street, London, S.W. 1, England. Tel. 01-235-5271.

C. PROJECT HEADQUARTERS:
1. Contact: Anthea Roberts at address in B.
2. Special facilities or activities available for visitor viewing: It is often possible to arrange for a visit to one of the Area Centers or to a school taking part in the trials.

D. PRINCIPAL PROFESSIONAL STAFF: E.A. Albany, lecturer at College of Education; D. Jones, teacher in a secondary school; J. Parker, teacher in a secondary school; A.G. Vosper, lecturer in College of Education.

E. PROJECT SUPPORT:
1. Organizational agencies: Nuffield Foundation and Schools Council.
2. Funding agency: Nuffield Foundation.

F. PROJECT HISTORY:
1. Principal originator: Nuffield Foundation.
2. Date and place of Initiation: September 1964; London.
3. Overall project purpose: To devise a contemporary approach to mathematics for children from 5 to 13.

G. PRESENT COMMERCIAL AFFILIATIONS: Teacher's Guides are being published by a consortium of W.R. Chamber and John Murray.

H. PROJECT OBJECTIVES: See F.3. It is the first project in the country for this age-range. Materials are being aimed at teachers rather than children; although some material for children is being produced at the lower secondary level. The teachers discuss and develop the materials at teacher's centers. The aims and methods of the project are elaborated in I Do and I Understand and Into Secondary School.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups. Each teacher uses a combination of methods including much group work, some project work, and a minimum of class instruction.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics for children from 5 to 13 years of age.

K. MATERIALS PRODUCED:
1. Computation and Structure.
2. Graphs Leading to Algebra.
3. Mathematics in Practice.
4. Computers and Young Children.

5. Logic.
6. Logic and Computers.
7. Purple Problems.
8. Checking-up II.
9. Guide to the Guides.
10. Into Secondary School.
11. Red Problems.
12. Checking-up I.
13. Shape and Size.
14. Film: "I Do and I Understand"
15. Into Secondary School.
16. Children and Mathematics - 5 films.

L. MATERIALS AVAILABLE FREE: Prospectus of publications available from W.R. Chamber, 11 Thistle Street, Edinburgh 2, Scotland.

M. MATERIALS PURCHASABLE: All items in K.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Teacher's Guides: Spanish, Dutch. Film: "I Do and I Understand", Italian.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
1. Decimals.
2. Simultaneous Equations.
3. Angles and Bearings.
4. Irrational Numbers.
5. Powers of Indices.
6. Integers.
7. Number Patterns 1 & 2.
8. Symmetry.
9. Similarity and Ratio.
10. Topology.
11. Mechanics.
12. Speed and Gradient 1 & 2.
13. Vectors.
14. Area and Volume.
15. Functionality.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: About 13,000 involved in trials.
2. Number of students involved: About 500,000 involved in trials.
3. Number of schools involved: About 2,200 involved in trials.
4. Total number of teachers using any of the materials: Impossible to say more than figures above but about 500,000 copies of guides have now been sold.

5. Are the totals stated in 1, 2, 3 and 4 estimated or definitive? Estimated.
6. Name and location of selected schools where the course is being taught: Middle Row Junior Mixed School, London; Gessroyal School, Yeoni.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Area organizer and teacher leaders are available at the Teachers' Centers set up throughout the country by the local education authorities.
2. Activities conducted for pre-service and in-service teacher training: In-service training during school hours and in the evening is carried out at the Teacher Centers.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Copies of the test versions of the teacher's guides are available to Colleges of Education through the ATCAE. Teachers interested in obtaining copies of the guides should write to C.A.R. Bridey, 77 Breefield Street, 7 Bath, Somerset.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff and the schools concerned and the Institute des Sciences de l'Education, Geneva.
2. Pertinent published research studies: Schools Council Final Report No. 4.
3. Brief abstract of in-house or unpublished research: Evaluation of the teachers visits is carried on at teacher's centers and in the schools involved in trials. In the light of reports from the areas, the books are revised before publication.
4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: WHERE Supplement 13 - from A.C.E., 57 Russell Street, Cambridge.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: The writing team has continued to enter material for trial in some areas. The material has been suited to the upper junior-lower secondary age range. A film "Into Secondary School" was made in 1968.

V. PLANS FOR THE FUTURE: Before the project closes in 1971 it is proposed to produce about eight more teachers guides for the upper junior-lower secondary teacher and about fifteen units of work on specific topics for lower secondary teachers and pupils. An infant film is also being made to complete the trilogy and it should be ready for release in early 1971.

A. PROJECT TITLE: **A RESEARCH PROJECT IN THE ACCELERATED TEACHING OF HIGHER LEVEL MATHEMATICS.**

B. PROJECT DIRECTOR: Dr. E. D. Tagg, 1 Newmarket Avenue, Lancaster, England. 0524 66007.

C. PROJECT HEADQUARTERS:
1. Contact: The Director, Accelerated Mathematics Project, Cartmel College, University of Lancaster, Bailrigg, Lancaster, England. 0524 65201, Ext. 4437.
2. Special facilities or activities available for visitor viewing: Not answered.

D. PRINCIPAL PROFESSIONAL STAFF: Miss A. Wootten, Senior Project Officer; Mr. J. R. Buxton, Junior Project Officer; Mr. R. Hepworth, Graphics Designer.

E. PROJECT SUPPORT:
1. Organizational agencies: Department of Mathematics and Department of Educational Research, at Lancaster University.
2. Funding agency: Department of Education and Science.

F. PROJECT HISTORY:
1. Principal originators: Prof. E. H. Lloyd and other members of Lancaster University.
2. Date and place of Initiation: Nov., 1968; University of Lancaster.
3. Overall project purpose: To investigate the possibilities of providing learning materials to enable students who did not go beyond 'O' level in school mathematics, to learn enough mathematics for a modern study of such subjects as economics, biology, etc.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:
1. To locate the deficiencies of the students.
2. To devise syllabuses suitable for them and for the work of their major department.
3. To produce and collect materials to provide a course which will enable students to reach the required standard with as little help as possible. This will be available for sixth forms of schools as well as universities and colleges.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Semi-programmed instruction, Lectures, Seminars, Films, Videorecordings, Tape/slide combination, Audio tape/overhead projector combination.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics for non-mathematicians. Freshmen (18+). 'O' Level Mathematics.

K. MATERIALS PRODUCED: 1, 2 Videotapes on 'Calculus Unlimited'.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: 1, 2 copies can be made for a service charge if tapes (Ampex 1") are sent to the Director.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Units on probability and periodic functions.

Q. PROJECT IMPLEMENTATION: Not answered.

R. TEACHER PREPARATION: Not answered.

S. PROJECT EVALUATION: None.

T. PROJECT PUBLICITY: Not answered.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Examination of available materials. Investigation of feasibility of syllabus in running courses. Co-operative conference (one day) with other projects in the U. K.

V. PLANS FOR THE FUTURE: One-day co-operative conference arranged for July. Arrangements in hand for construction and publication of modules. Further courses planned. Papers being written for (1) Conference of the Association for Programmed Learning and Educational Technology and (2) Mathematical Education in Science and Technology.

A. PROJECT TITLE: THE SCHOOL MATHEMATICS PROJECT (S.M.P.).

B. PROJECT DIRECTOR: Dr. B. Thwaites, Westfield College, Kidderpore Avenue, London, N. W. 3., England. 01-435-7601.

C. PROJECT HEADQUARTERS:

1. Contact: The Director, Assistant Director or Secretaries of the S. M. P.; all at the above address.

2. Special facilities or activities available for visitor viewing: None at the College.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. D. C. Taylor, Assistant Director; Mrs. E. Smith, Editor; Miss J. Sinfield and Mrs. J. Whittaker, Secretaries.

E. PROJECT SUPPORT: Funds were drawn from many British foundations and industrial companies. Some support also from royalties on published texts.

F. PROJECT HISTORY:

1. Principal originators: Dr. B. Thwaites, Mr. T. A. Jones, Mr. D. A. Quadling, Mr. T. D. Morris, Dr. H. M. Cundy.

2. Date and place of Initiation: September 1961; Southampton.

3. Overall project purpose: To create a curriculum for secondary school mathematics which reflects the nature of mathematics and its applications, and its relevance to the 20th century.

G. PRESENT COMMERCIAL AFFILIATIONS: Cambridge University Press.

H. PROJECT OBJECTIVES:

1. This is a free association of school teachers of mathematics who have a common interest in improving the teaching of mathematics by developing syllabuses, texts and other classroom materials.

2. The Project has concentrated on three lines of work: the production of several series of texts; the organisation of meetings to assist teachers in their approach to these and other texts; and the introduction of new examinations to loosen the hold of the traditional topics.

3. The teacher-training courses are vital: the many hundreds of teachers who attend them each year provide essential feedback from the classroom. They also give teachers the chance to cross-examine the S. M. P. authors and to delve more deeply into the interrelationship within the texts.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Various methods are employed dependent on individual teachers' ideas.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics; Ages 11-18.

K. MATERIALS PRODUCED: Request catalog from Cambridge University Press, Bentley House, 200 Euston Road, London, N. W. 1., England.

L. MATERIALS AVAILABLE FREE: Director's Report, published annually. Available from Project Office at Westfield College.

M. MATERIALS PURCHASABLE: See item K.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. 1969-70: Completion of the Main-School Course.
2. 1969-70: Completion of the O-Level Course.
3. 1969-72: The A-Level Course.
4. Annually: The Teacher-Training Courses should be strongly developed still further and increasingly used to obtain feedback from schools about all aspects of S. M. P.
5. 1970-73: The G. C. E. Examinations.
6. 1969-70: Information Meetings.
7. 1969-71: Assessment. Preliminary investigations in depth will be made into the problem of assessing both the textual material and the examinations, with a view to attracting substantial benefactions for research in 1971-74.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 3000 - 4000.
2. Number of students involved: 100,000 - 150,000.
3. Number of schools involved: About 1000.
4. Total number of teachers using any of the materials: Not known.
5. Are the totals stated in 1, 2, 3 and 4 estimated or definitive? Estimated.
6. Name and location of selected schools where the course is being taught: Several hundred.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: All authors offer advice to any teachers requesting help.
2. Activities conducted for pre-service and in-service teacher training: Courses are held throughout the year at various locations.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. **PROJECT EVALUATION:** Some independent assessment and evaluation of the Project is likely to be undertaken in 1970/71. Materials are constantly revised as a result of classroom experience by the principal authors.

T. **PROJECT PUBLICITY:** The annual Director's Reports give widespread publicity to the Project.

U. **BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:** Request the Director's Report 1968/69, available from the S. M. P. Secretary.

V. **PLANS FOR THE FUTURE:**

1. Continuing revision of existing texts.
2. Completion of Further Mathematics series of books.
3. Completion of A-H series of books.

A. PROJECT TITLE: SCIENCE 5/13.
Listed in Sixth International Clearinghouse Report as 'Junior Science Project'

B. PROJECT DIRECTOR: Leonard F. Ennever, Project Director, University of Bristol School of Education, 9 Tyndall Avenue, Bristol BS8 1TQ, England. Bristol 24161, Ext. 738/9.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: General hospitality.

D. PRINCIPAL PROFESSIONAL STAFF: Albert James, Deputy Project Director; Mrs. Wynne Harlen, Evaluator; Miss Sheila Parker, Research Associate; Donald T. Radford, Research Associate; Roy Richards, Research Associate.

E. PROJECT SUPPORT:
1. Organizational agency: University of Bristol.
2. Funding agencies: Schools Council, Nuffield Foundation, Scottish Education Department.

F. PROJECT HISTORY:
1. Principal originator: Schools Council.
2. Date and place of Initiation: 1st April, 1967; University of Bristol.
3. Overall project purpose: To assist teachers in helping children to learn science through discovery methods.

G. PRESENT COMMERCIAL AFFILIATIONS: Macdonald Educational - Publishers.

H. PROJECT OBJECTIVES: In its publication 'With Objectives In Mind' the Project has made a 'Statement of Objectives for Children Learning Science'. This links units of work, written for teachers, that illustrate how children might be helped to achieve these objectives and others that the teacher might have in mind. The units do not constitute a course; rather, they are materials from which a course might be constructed - since the Project believes that teachers should be responsible for planning and carrying out the work of their own classes, and that children should be helped to solve by their own efforts problems that they have chosen themselves from their own environment.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups, Free investigation of the environment.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science - for pupils aged between 5 and 13 years of all ability levels.

K. MATERIALS PRODUCED:

1. With Objectives In Mind - a guide to the project.
2. Working With Wood, Stages I & II.
3. Working With Wood, Background Information.
4. Trees, Stages I & II.
5. Metals, Stages I & II.
6. Metals, Background Information.
7. Time, Stages I & II.
8. Time, Background Information.
9. Early Experiences - for infants.
10. Structures & Forces, Stages I & II.
11. Science from Toys, Stages I & II.

L. MATERIALS AVAILABLE FREE: Newsletters and statements of objectives. From project headquarters.

M. MATERIALS PURCHASABLE:

1. First set of Units - Numbers 1-8 inclusive, 30s. + postage.
2. Second set of Units - Numbers 9-11 inclusive, 24s., post free in U.K., extra abroad. Trial Editions. Until November 1970.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Mostly those concerned with able pupils in the 11-13 age-group.

1. Structure and Forces, Stage III.
2. Holes, Gaps and Cavities, Stages I, II, III.
3. Mini-beasts, Stages I, II.
4. Coloured Things, Stages I, II, III.
5. Problems of Shape and Size, Stage III.

Q. PROJECT IMPLEMENTATION:

1. Materials are as yet only in trial form. Evaluation is being carried out in 72 schools in England and Wales (3,000 pupils) with a similar number of controls; the numbers in Scotland are fewer.
2. Name and location of selected schools where the course is being taught: England, Wales, Scotland.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials:
   - (a) Courses run by Project.
   - (b) Services of adviser or representative of the Local Education Authority.
   - (c) Services of Teachers' Centres.

2. Activities conducted for pre-service and in-service teacher training:

(a) One week courses, (10 - 12) including materials. These are for teachers or for College of Education lecturers and local education authority advisers.

(b) Lectures and demonstrations to students in college and to serving teachers.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Project materials and costs as already specified.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies: None.

3. Brief abstract of in-house or unpublished research: Various internal papers not generally for outside distribution.

4. Additional evaluative data available to interested individuals: Not as yet.

T. PROJECT PUBLICITY:

1. 'Helping Children to Learn Science' - Dialogue No. 1 September 1968, Schools Council Publication.

2. 'Science 5/13' - Education in Science, No. 33, June 1969, A.S.E. Publication.

3. 'Nuffield Science 5/13' - Times Educational Supplement, 9th January 1970, Review Section.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Trials of materials started September 1969; materials in Trial Edition published at same time.

V. PLANS FOR THE FUTURE:

Project has been extended from September 1970 to September 1972.

A. PROJECT TITLE: SELF-TEACHING IN UNIVERSITY SCIENCE COURSES.

B. PROJECT DIRECTOR: Professor L. R. B. Elton, Institute for Educational Technology, University of Surrey, Guildford, Surrey, U.K. Guildford 71281, Ext. 402.

C. PROJECT HEADQUARTERS:
1. Contact: P. J. Hills, Institute for Educational Technology.
2. Special facilities or activities available for visitor viewing: Experimental tape/slide booths etc. are available for visitor viewing together with short account of work in hand.

D. PRINCIPAL PROFESSIONAL STAFF: P. J. Hills, Leverhulme Research Fellow.

E. PROJECT SUPPORT:
1. Organizational agencies: Not answered.
2. Funding agency: Leverhulme Trust Fund.

F. PROJECT HISTORY:
1. Principal originator: Professor L. R. B. Elton.
2. Date and place of Initiation: April 1969; University of Surrey.
3. Overall project purpose: To investigate means of providing in university science courses a learning environment which will enable students to become self-sufficient in their learning methods.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Objectives stated in F3 above. The difference between this and other projects is in the emphasis in the development of situations for self-teaching, i.e. integration of audio-visual and programmed learning techniques, not as an aid to instruction in conjunction with the lecturer, but as a separate situation to enable the lecturer to function more directly in face to face discussion sessions.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Lectures, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics, physics, chemical physics, metallurgy and materials technology, all at 1st year university level.

K. MATERIALS PRODUCED:
1. Taped lectures with associated printed notes for 'Structure of Atoms' course.
2. Tape/slide lectures (3) on the above course.

3. Taped lectures with associated printed notes. Radiation course.

4. Taped course with associated material on rapid reading for university students.

5. Tape recorded presentations on:
    (a) The use of the library.
    (b) The use of the library catalogue.
    (c) The use of periodicals.

6. A simulation of an experiment on the photoelectric effect in the practical physics course. (Simulation uses 8 mm. sound film and tape/slide presentation)

7. A programmed experiment on the photoelectric effect in the practical physics course.

8. An audio programmed version of No. 7.

9. A practical introduction to the periodic system using video tape and programmed learning materials in the chemical physics lab. course.

10. A programme on the use of the Houndsfield tensometer to investigate polymer samples in the materials lab. course.

L. MATERIALS AVAILABLE FREE: Limited copies of written programmes etc. available from P. J. Hills, Leverhulme Research Fellow, Institute for Educational Technology, University of Surrey, Guildford. A copy of taped material could be supplied on receipt of a blank tape.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. A series of remedial chemistry tape/slide presentations for use in the library.

2. Audio programme lectures on second order of differential equations for use with the mathematics course for first year science students.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Not applicable.

2. Number of students involved: Approximately 200.

3. Number of schools involved: 1 (University of Surrey)

4. Total number of teachers using any of the materials: 5.

5. Total number of students using any of the materials: Approximately 200.

6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Definitive.

7. Name and location of selected schools where the course is being taught: University of Surrey, Guildford, Surrey.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Personal consultation with P. J. Hills.
2. Activities conducted for pre-service and in-service teacher training: Not applicable.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Does not apply at present.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated: Evaluation is in progress.
2. Pertinent published research studies: At present none.
3. Brief abstract of in-house or unpublished research: The present phase of the research is concerned with investigating the problems of the introduction of self-teaching situations into university science courses and with an investigation of the range of methods available.
4. Additional evaluative data available to interested individuals: Progress reports will become available at various stages of the project and interested individuals could be included on the mailing list.

T. PROJECT PUBLICITY: Project just at stage before publications begin to appear.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Plans for future include a more extensive use of self-teaching situations in the course.

A. PROJECT TITLE: SHROPSHIRE MATHEMATICS EXPERIMENT (S.M.E.).

B. PROJECT DIRECTOR: Mr. R. S. Heritage, Department of Mathematics, St. Peter's College of Education, Saltley, Birmingham 8, England. 021-327-3734/5/6.

C. PROJECT HEADQUARTERS:
1. Contact: Mr. R. S. Heritage, 37 Heath End Road, Alsager, Stoke on Trent, Staffs. ST7 2SQ, United Kingdom, or to St. Peter's College. Phone for Heath End Road: 09-363-2963.
2. Special facilities or activities available for visitor viewing: School visits can be arranged with Mr. R. T. Hills, Education Department, Shire Hall, Shrewsbury or with the Director of SME.

D. PRINCIPAL PROFESSIONAL STAFF: Adviser to the Experiment: Mr. I. R. Vesselo; Local Authority Liaison: Mr. R. T. Hills; Authors: W. I. Lewis, J. D. Edge, R. S. Heritage.

E. PROJECT SUPPORT:
1. Organizational agencies: Shropshire County Education Authority.
2. Funding agencies: Local Education Authority has subsidized the purchase of books by schools. Test versions of books sold at cost by Penguin Books, Ltd.

F. PROJECT HISTORY:
1. Principal originators: R. S. Heritage, I. R. Vesselo (for Penguin Books), R. D. Price (for L. E. A.).
2. Date and place of Initiation: Summer 1964; Shrewsbury Technical College.
3. Overall project purpose: To satisfy the need felt by secondary teachers of Shropshire for curriculum reform in mathematics.

G. PRESENT COMMERCIAL AFFILIATIONS: Penguin Education, Penguin Books Ltd, Horton Road, West Drayton, Middlesex.

H. PROJECT OBJECTIVES: Aim: to improve school mathematics by developing: a. teching methods. b. the language of mathematical communication. c. better concept attainment. d. the content of the syllabus. The project began by working within a traditional syllabus with a known end-product, but has now begun to introduce considerable change of content. The treatment of the work is 'integrated' but still allows for alternatives in subject matter. The project maintains close personal contact with the teachers involved and their criticisms, and suggestions and comments are taken into account in every way possible. The planning of the work also takes into account the pupil's psychological needs and departs from traditional British practice considerably on this account.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Class discussion, Group activity.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics, Secondary stage, O-level, CSE, non-examination pupils 11-16 years. A-level work in preparation.

K. MATERIALS PRODUCED:
1. Learning Mathematics, Books 1, 2, 3, 4 Revised (1964-1970).
2. Learning Mathematics, Books 3m, 4m (1968,9).
3. Learning Decimal Currency.
4. Teachers' Book.
5. Answer Books 1-3.
6. Learning Mathematics, Stage 5, Booklet 1, Vector Geometry and Transformation Geometry (1970).

L. MATERIALS AVAILABLE FREE: Director's reports available as published from the director of the experiment.

M. MATERIALS PURCHASABLE: Penguin Books Ltd, Horton Road, West Drayton, Middlesex.
Items 1 and 2, 10/6d; Item 3, 3/6d; Item 4, Out of print; Item 5, 4/6d; Item 6, To be announced.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None at present.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 60.
2. Number of students involved: About 8000.
3. Number of schools involved: 40.
4. Total number of teachers using any of the materials: Not known.
5. Total number of students using any of the materials: Estimated 30,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? 1 and 3 definitive.
7. Name and location of selected schools where your course is being taught: Harlescott Girls' School, Shrewsbury; Cleobury Mortimer Secondary Modern School; St. Martin's Secondary Modern School; Phoenix Comprehensive School, Dawley. (Out of project area: Bishop Dunn Bilateral School, Nottingham).

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Director is available on short notice.

2. Activities conducted for pre-service and in-service teacher training: General meetings are held twice a term (6 times a year) and courses are run in this time. Initially, meetings were weekly.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None published. Short statement of results available from the Director.
3. Brief abstract of in-house or unpublished research: None available yet.
4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: Mathematical Gazette, May 1965, Vol. XLIX, No. 368, pp. 132-5.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Advanced Mathematics (for A-level) in preparation. Testing in parts by interested schools, not all in Shropshire. Experimental work for the less able on trial in one school.

V. PLANS FOR THE FUTURE: Main course now complete in two versions. Development of alternative material for certain topics (Stage 5) 1970. Development of enrichment materials and of alternative teaching procedures 1970-1. Testing of A level material 1970.

A. PROJECT TITLE: SCOTTISH INTEGRATED SCIENCE COURSE.

B. PROJECT DIRECTOR: W.R. Ritchie, H.M.I., Scottish Education Department, St. Andrew's House, Edinburgh 1, Scotland.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Arrangements can be made to see schools where the scheme is taught.

D. PRINCIPAL PROFESSIONAL STAFF: H.M. Inspectors of Schools: A.W. Jeffrey and S.T.S. Skillen.

E. PROJECT SUPPORT:
1. Organizational agency: Scottish Education Department.
2. Funding agency: The pilot phase is now over and the local education authorities are putting the scheme into their secondary schools.

F. PROJECT HISTORY:
1. Principal originator: Scottish Education Department.
2. Date and place of Initiation: February 1965; Edinburgh.
3. Overall project purpose: To provide an integrated form of the new Scottish physics, chemistry and biology syllabuses for 12-14 year old pupils.

G. PRESENT COMMERCIAL AFFILIATIONS: Not answered.

H. PROJECT OBJECTIVES: See Curriculum Paper No. 7, of the Scottish Education Department, published by Her Majesty's Stationary Office, 13A Castle Street, Edinburgh, Scotland. Objectives stated on page 16. A - In the Cognitive Field. B - In the Affective Field. C - In the Psycho-Motor Field. The main characteristic is the permeation of all the materials by the specific objectives (200 are stated for the various syllabus sections). The pupil worksheets are constructed with the hierarchy of objectives in mind. Pupils encounter questions and suggestions involving more and more complex cognitive objectives as they read a sheet. The battery of test items checks pupil progress.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, Laboratory investigations (using worksheets), Lectures, Demonstration and Visual aids.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Physics, chemistry and biology; ages 12-14.

K. MATERIALS PRODUCED:
1. Memoranda (Teacher's Guides).

2. Objective Test Items.
3. Apparatus Aids.
4. Curriculum Paper No. 7, Scottish Education Department. (Contains syllabus, objective and report of working party)
5. Worksheets, for pupil use in laboratory.

L. MATERIALS AVAILABLE FREE:
Items 1 and 2, from: Scottish Education Department, St. Andrew's House, Edinburgh.
Item 3, from: Scottish School Science Equipment Research Center, 103 Broughton St., Edinburgh.

M. MATERIALS PURCHASABLE:
Item 4, from: HMSO, 13A Castle Street, Edinburgh, U.K., 9/6d.
Item 5, from: Heinemann Publishers, 48 Charles St., London.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
Science topics for 15-16 year old pupils not attempting Examination Courses.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: Two-thirds of Scottish Secondary Schools.
2. Number of students involved: 60,000.
3. Number of schools involved: 300.
4. Total number of teachers using any of the materials: 1500.
5. Total number of students using any of the materials: 60000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: See C.2 above.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: H.M. Inspectors of Schools.
2. Activities conducted for pre-service and in-service teacher training: Pre-service: All Scottish Science teachers attend Colleges of Education for 1 year pre-service after the University. In-service: College of Education Courses. Local education authority conferences and courses, financed from national pool of in-service funds.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: College of Education science lecturers - conferences and courses with writers of schemes.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by the Sterling University Education Department and the Glasgow University Education Department.

2. Pertinent published research studies: None published as yet.

3. Brief abstract of in-house or unpublished research:
Ph. D. Thesis on 12-13 year old work.
M. Ed. Thesis on 13-14 year old work.

4. Additional evaluative data available to interested individuals: None yet.

T. PROJECT PUBLICITY:

None published yet. Some is in preparation.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:

Report (Curriculum Paper No. 7) published June 1968. Two-thirds of Scottish Secondary Schools adopted by Sept. 1968.

V. PLANS FOR THE FUTURE:

Completion of science topics for 15-16 year old pupils.
New Central Science Commission of Scottish Education Department to be set up to review whole of school science.

A. PROJECT TITLE: SCOTTISH MATHEMATICS GROUP PROJECT. (SCOTTISH PROJECT).

B. PROJECT DIRECTOR: Mr. Peter Whyte, Rector, Hutchesons' Boys' Grammar School, 21 Beaton Road, Glasgow, Scotland, U.K. 041-423-2933.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Visits to schools can be made after prior arrangement with director.

D. PRINCIPAL PROFESSIONAL STAFF: Brenda I. Briggs, Lecturer, University of Southampton; Helen C. Murdoch, Teacher, Hutchesons' Girl's Grammar School; Elizabeth K. Henderson, Headmistress, Westbourne School for Girls; W. T. Blackburn, Lecturer, Dundee College of Education; W. Brodie, Headmaster, Trinity Academy; C. Clark, Teacher, Lenzie Academy; D. Donald, Teacher, Robert Gordon's College; R. A. Finlayson, Headmaster, Allan Glen's School; J. L. Hodge, Teacher, Madras College; J. Hunter, Lecturer, University of Glasgow; T. K. McIntyre, Teacher, High School of Stirling; R. McKendrick, Teacher, Langside College; W. More, Teacher, Dundee High School; A. G. Sillitto, (deceased) Lecturer, Jordanhill College of Education; A. A. Sturrock, Teacher, Grove Academy; Rev. J. Taylor, Teacher, St. Aloysius' College; E. B. C. Thornton, Teacher, Glasgow Academy; J. A. Walker, Teacher, Dollar Academy; R. D. Walton, Teacher, Dumfries Academy; P. Whyte, Headmaster, Hutchesons' Boy's Grammar School; H. S. Wylie, Headmaster, City Public Secondary School; A. G. Robertson (Formerly H. M. I.) Headmaster, John Neilston High School.

E. PROJECT SUPPORT:
1. Organizational agencies: The initial experimental work was supported by the Scottish Education Department.
2. Funding agencies: The textbooks published by Messrs. Blackie-Chambers and written by the Scottish Mathematics Group are a commercial venture.

F. PROJECT HISTORY:
1. Principal originators: Scottish Education Department and the Scottish Mathematics Group.
2. Date and place of Initiation: 1963; Edinburgh.
3. Overall project purpose: To produce a syllabus and textbooks in keeping with modern trends in the teaching of school mathematics.

G. PRESENT COMMERCIAL AFFILIATIONS: The textbooks "Modern Mathematics for Schools" Books 1 - 9 are published jointly by Messrs. Blackie & Son, Bishopbriggs, Glasgow, and Messrs. W & R Chambers, Thistle Street, Edinburgh; Overseas distributors:

The overseas agents and representatives of both Blackie and Chambers.

H. PROJECT OBJECTIVES: The general objective of this syllabus is to provide a course that will interest pupils in mathematics and will train them to use the language in which popular, technical and professional texts are now being written. It gives pupils an early introduction to the concept of a set, the structure of a number system, the use of vectors and the idea of a group. The aim is to relate mathematics to the solution of up to date problems by means of linear programming, the use of matrices, iterative processes and calculating machines - in short to include the kind of mathematics which reflects modern developments and leads to useful links with later work at school, college or university. The texts seek to combine the best of the new and the traditional mathematics, and of the methods of teaching them.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Discussion groups and Class teaching.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics in the Scottish Certificate of Education set by the S. C. of E. Examination Board. Ordinary Grade, 11 1/2 - 16 years, top 35-40% of school population. Higher Grade, 16 - 17 years, top 10-15% of school population. With the introduction of a common course in all comprehensive schools in Scotland, a version of the course is being taught to most post-primary pupils.

K. MATERIALS PRODUCED:

1-9. Modern Mathematics for School Books 1-9, (including pupil's and teacher's editions)
10. A Review of the First Five Years.
11. Three Figure Mathematical Tables.
12. Activity Workbook 1 for Modern Mathematics.
13. Modern Mathematics for Schools Book 1S.
14. Miscellaneous publicity material.
15, 16, 17. Modern Mathematics for Schools (South African Edition) Books 1, 2 and 3.
18, 19, 20. Modern Mathematics for Australian Schools. Books 1, 2 and 3.
21. Modern Mathematics for Schools, Book 5A (C.S.E. edition)
22. Modern Arithmetic for Schools.
23. Graph Workbook for Modern Mathematics.
24. Modern Mathematics for Schools (Malaysian Edition) Book 1.

L. MATERIALS AVAILABLE FREE: Item Number 14. Messrs W. & R. Chambers, Thistle Street, Edinburgh.

M. MATERIALS PURCHASABLE:

Items 1, 2. Pupil's version 13/- Teacher's version 18/-

Item 3, 4.	Pupil's version 14/-	Teacher's version 18/-
Item 5, 6, 7.	Pupil's version 13/6	Teacher's version 16/6
Item 8.	Pupil's version 15/-	Teacher's version 16/6
Item 9.	Pupil's version 16/-	Teacher's version 16/6
Item 10.	2/6	
Item 11.	1/9	
Item 12.	2/11	
Item 13.	7/-	
Item 15-20.	Prices not known.	
Item 21.	Pupil's version 15/-	Teacher's version 17/6
Item 22.	Pupil's version 10/6	Teacher's version 15/6
Item 23.	3/-	
Item 24.	Price not known.	

All available from Messrs. W. & R. Chambers, Thistle Street, Edinburgh and Messrs. Blackie & Son, Ltd., Bishopbriggs, Glasgow.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Dutch, Swedish, Norwegian, Spanish. Adaptations in progress for Malaysia, Singapore, Hong Kong and the Caribbean.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Nearly all teachers of math in Scotland, many more in England, Ireland, Holland (almost all), some in South Africa and Australia.
2. Number of students involved: Over 150,000.
3. Number of schools involved: All secondary schools (c. 600) in Scotland; many more in England, Ireland, Holland, South Africa and Australia.
4. Total number of teachers using any of the materials: Impossible to estimate this number.
5. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? The Scottish numbers are reasonably definite, but no estimate possible of others.
6. Name and location of selected schools where the course is being taught: Apply to Director.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Teacher vacation courses have been held at the College of Education in Edinburgh, Glasgow, Aberdeen, Dundee and will continue for a few years.
2. Activities conducted for pre-service and in-service teacher training: Saturday morning conferences, seminars, discussion groups. University extra-mural classes in the evenings.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION: Only in so far as it has prepared pupils for the examination of the Scottish Certificate of Education Examination Board.

T. PROJECT PUBLICITY: Review by Dr. E. A. Maxwell in Mathematical Gazette, Volume 11, No. 380, May 1968, G. Bell & Sons, London.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: The Group is considering the future requirements of mathematics courses and the whole series is under consideration for long-term revision.

A. PROJECT TITLE: LOWER VALLEY PROJECT IN MATHEMATICS.

B. PROJECT DIRECTOR: W.J. Norman Emery, Primary Schools Organizer, Education Department, Pontmorlais, Merthyr Tydfil, Glam, U.K. Telephone: Merthyr Tydfil 2761.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Visits to schools.

D. PRINCIPAL PROFESSIONAL STAFF: Departmental Professional Staff: Mr. D.C. Williams, Deputy Director of Education; Mr. W.J.N. Emery, Primary Schools Organizer; Mr. W. Lawrence, Secretary, Teachers' Centre; head teachers of primary schools and comprehensive school with senior staff and teachers.

E. PROJECT SUPPORT:
1. Organizational agency: Not answered.
2. Funding agency: Local Education Authority.

F. PROJECT HISTORY:
1. Principal originators: Mr. John Beale, Director of Education; Mr. D.C. Williams, Deputy Director of Education; Mr. W.J.N. Emery, Primary Schools Organizer.
2. Date and place of Initiation: 1968; Merthyr, Tydfil.
3. Overall project purpose: To ensure a continuous, progressive programme in mathematics learning, based on understanding, concept development and application.

G. PRESENT COMMERCIAL AFFILIATION: None.

H. PROJECT OBJECTIVES:
1. To encourage every pupil, according to needs and development, to acquire:
    (a) an understanding of basic mathematical concepts.
    (b) a sound knowledge of relevant facts, and relationships in number, money, weights and measures.
    (c) a competence in operations involving skills and techniques.
    (d) an awareness of spatial relationships, with shape.
2. To encourage an approach through experience, experiment, investigation and discovery, with activities related to the requirements of the individual.

Unique Characteristics:
It differs from any other known similar projects in content, organization and method, because:
    (a) it deliberately 'isolates' concept development activities, but maintains an integrated approach.
    (b) it follows a carefully devised and coded, organization

of group activities plan, for all aspects of mathematics.
(c) it serves the pace and development of each pupil.
(d) it is progressive and continuous.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, Lectures, Seminars.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics; age 5 years - 13 years; all abilities.

K. MATERIALS PRODUCED:

1. Progressive Programme from 5-13 years, covering all aspects of mathematics with particular reference to concept development.
2. Progressive series of assignment cards in each aspect.
3. Lists of suggestions on various materials for pupil involvement.
4. Organization Charts to ensure equal participation of every pupil in each aspect of mathematics.

L. MATERIALS AVAILABLE FREE: Contact project director for details.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Materials are being developed which will assess progress with some specifically designed to assess levels of understanding and concept development.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 40.
2. Number of students involved: Some students involved during practice/observation periods.
3. Number of schools involved: 10 plus Comprehensive (Junior section).
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: Schools involved in Lower Valley Project.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Easy communication between myself and teachers; visitations, Teachers' Centers, etc.
2. Activities conducted for pre-service and in-service teacher training: In-service training is conducted through lectures, discussions, study groups, etc., and involves the

development of new attitudes, presentation of the new mathematics content, and it provides for teacher participation in new discovery methods. It takes place at Teachers' Centers and Workshops. Lectures are held at Teachers' Centers and are currently being given to 300 teachers, drawn from a wide area, at the University College of Wales Faculty of Education, Cardiff. The present series of lectures will be followed by a series for teachers of pupils aged 5-8 years, during next term.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: Contact director.
3. Brief abstract of in-house or unpublished research: Contact director.
4. Additional evaluative data available to interested individuals: Contact director.

T. PROJECT PUBLICITY: None as yet.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

The Project is a long term one, and is developing continually - other authorities are showing interest and are watching progress. Discussions, meetings, etc., will continue.

A. PROJECT TITLE: SWANSEA SCHEME.

B. PROJECT DIRECTOR: Professor J.D. Weston, Department of Pure Mathematics, University College, Swansea, SA2 8PP, Glam., Great Britain. Telephone: Swansea 25678, Ext 334.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: By arrangement.

D. PRINCIPAL PROFESSIONAL STAFF: J.D. Weston, Professor; M.T. McGregor, Lecturer.

E. PROJECT SUPPORT: None.

F. PROJECT HISTORY:
1. Principal originator: Professor J.D. Weston.
2. Date and place of Initiation: 1963; University College of Swansea.
3. Overall project purpose: To devise a new pure mathematics (A-level) syllabus which would reflect the logical accuracy of the subject and introduce the pupil to axiomatic theory.

G. PRESENT COMMERCIAL AFFILIATIONS: Cambridge University Press (see K2) and Klett Verlag, Stuttgart (see K2)

H. PROJECT OBJECTIVES: The chief purpose of the Swansea scheme is to demonstrate that, 'with suitable presentation, topics can be treated with logical accuracy in the sixth form to a far greater extent than is usual at present, and consequently that pupils can be given a better understanding of the nature of mathematics than has hitherto been possible'.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Lectures, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Pure Mathematics, A-level, 16-18 years.

K. MATERIALS PRODUCED:
1. J.D. Weston, Notes on the circular functions, second edition, (University College of Swansea, 1966).
2. J.D. Weston and H.J. Godwin, Some exercises in pure mathematics with expository comments, (Cambridge University Press, 1968).

L. MATERIALS AVAILABLE FREE: None at present.

M. MATERIALS PURCHASABLE:
Item 1, 3s.0d., Source: The Singleton Bookshop, Swansea, SA2 8PP, Glam., U.K.
Item 2, 13s.0d., Source: any bookseller.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: German.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None at the moment.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 7.
2. Number of students involved: About 15.
3. Number of schools involved: 2 at present.
4. Total number of teachers using any of the materials: 40.
5. Total number of students using any of the materials: Not known.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Amman Valley Grammar School, Ammanford, Carmarthenshire, Wales; Bishop Gore Grammar School, Swansea, Wales.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Available through persons mentioned in Section D.
2. Activities conducted for pre-service and in-service teacher training: Two study groups were formed to provide pre-service teacher training; this service was partly financed by the Department of Education, University College of Swansea.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers:
   (a) Alternative syllabus for Pure Mathematics at Advanced level.
   (b) Outline of an introductory course in Analysis, Part 1.
   (c) Outline of an introductory course in Analysis, Part 2.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? No.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: Evaluation of this scheme is possible through examination results, teachers' reports, and university performance of pupils. Detailed information on each of these is confidential at present.
4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY:

1. M.G. Hughes, "A Sixth Form Experiment", Teacher in Wales, July 1965.
2. M.G. Hughes, "Accurate Reasoning in Sixth-form Pure Mathematics", Mathematics Gazette, October 1965.
3. Mathematics projects in British secondary schools (Math. Association, 1968).

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Candidates from 2 schools continue to sit the A-level examination on the alternative syllabus, and informal contact has been maintained with teachers who have shown some interest in the scheme.

V. PLANS FOR THE FUTURE:
It is hoped that, in the near future, a number of schools will participate more fully in the scheme.

A. PROJECT TITLE: ALL INDIA SCIENCE TEACHERS ASSOCIATION PHYSICS STUDY GROUP (AISTA PHYSICS STUDY GROUP)

B. PROJECT DIRECTOR: Mr. B.G. Pitre, Director, AISTA Physics Study Group, The Doon School, Dehra Dun, India. 3645.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Visitors are welcome to review text material and equipment on display, and to attend trial classes at the Doon School when in session.

D. PRINCIPAL PROFESSIONAL STAFF: The Director is the only full-time professional staff. The working group consists of five members, mostly teachers, supported by an Advisory Committee consisting of mostly research scientists, university teachers and science educators.

E. PROJECT SUPPORT:
1. Organizational agencies: All India Science Teachers Association; National Council for Science Education; National Council of Educational Research & Training.
2. Funding agencies: National Council of Educational Research & Training, Mehrauli Road, New Delhi 16, India.

F. PROJECT HISTORY:
1. Principal originators: Views expressed at annual meetings of the AISTA culminated in support from the two agencies of the Central Government (NCSE and NCERT) to the Director who is editor of the Journal of the Association.
2. Date and place of Initiation: January 1st, 1968; The Doon School, Dehra Dun.
3. Overall project purpose: To develop a laboratory-oriented and structured physics curriculum for middle through high school grades.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Project objectives are to develop a laboratory-oriented, investigatory and structured physics curriculum for grades 6 through 11. Unique characteristics of the project are the following:
1. The Study Group works on behalf of the All India Science Teachers Association.
2. It is the only project directed by a practicing teacher.
3. It is aimed at advancing the multiplier potential and leadership in science education by supporting the ability of individual science teachers.

A 14 page booklet "Today's Education for the Needs of Tomorrow" gives the theoretical background to the work of the

Study Group.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigation.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Physics: Grades 6 through 11; age group 10+ through 15+; average ability children in schools with average equipment.

K. MATERIALS PRODUCED:
1. Year I (Grade 6) Students' Workbook called "Physics Through Experiments".
2. Year I (Grade 6) Teacher's Resource Book.
3. Year III (Grade 8) Students' Workbook called "Physics Through Experiments".
4. Year III (Grade 8) Teacher's Resource Book.
(The second experimental edition of the two workbooks came out in January 1970)
5. Theoretical background booklet called: "Today's Education for the Needs of Tomorrow".

L. MATERIALS AVAILABLE FREE: Experimental editions of all materials are available from the headquarters of the Study Group.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: A Marathi edition of grade 6 workbook will be completed by April 1970.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Workbook for all grades; Teacher's Resource Books for all grades.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 5 (Grades 6-8).
2. Number of students involved: About 300.
3. Number of schools involved: 5.
4. Total number of teachers using any of the materials: About 15.
5. Total number of students using any of the materials: About 1000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? 1, 3 definitive. 2, 4, 5 estimated.
7. Name and location of selected schools where the course is being taught: The Doon School, Dehra Dun; Mayo College, Ajmer; Punjab Public School, Nabha.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: None except through correspondence with headquarter staff.

2. Activities conducted for pre-service and in-service teacher training: An inservice institute of about 5 weeks duration is held at the headquarters for teachers and teacher-trainers from all over India: all participant costs (approximately $250) are met by central agencies and through foreign aid. Free board, lodging, books, etc., are provided. Two more institutes are planned next year.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated: No. A systematic evaluative programme is planned for grade six in ten schools in Bombay beginning June 1970.

2. Pertinent published research studies: None.

3. Brief abstract of in-house or unpublished research: Specific and general goals are defined. Unit tests and achievement tests have been prepared and given to pupils in the five schools. Feedback data has been used to improve materials.

T. PROJECT PUBLICITY:

1. The Times of India - Oct. 25, 1966.
2. Vigyan Shikshak - Jan-March 1969.
3. Indian Public Schools Conference, Annual meeting Feb. 1968.
4. Instrument India - Feb. 1970.
5. Teaching - March 1970.
6. N.C.S.E. Agenda - March 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

April 1970: Institute for teachers and educators in the Bombay school system leading to systematic trial in ten schools from June 1970.

May 1970: Institute at the headquarters.

Jan.1971: Institute for teachers from English medium schools leading to systematic trials in twenty-five schools from Jan. 1971.

A. PROJECT TITLE: COMMUNITY SCIENCE CENTRE (CSC).

B. PROJECT DIRECTOR: Dr. K.B. Shah, Director, Community Science Center. Sanskar Kendra, Paldi, Ahmedabad-6, India. (After June 1970: Navrangpura, Ahmedabad-9, India).

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Visitors can observe the activities in session and visit the laboratories, library and workshop of the Center.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. K.B. Shah, Director and Collaborator in Physics; Mr. L.S. Prahlada Rao, Collaborator in Biology; Dr. C.J. Sanchorawala, Collaborator in Chemistry; Mr. R. Kothari, Audio-visual Expert; Mr. M.D. Suthar, Collaborator in Mathematics; Mr. C.B. Kanojia, In-charge of Workshop.

E. PROJECT SUPPORT:
1. Organizational agencies: None.
2. Funding agencies: Government of India, State Government of Gujarat, Nehru Foundation for Development, Asia Foundation.

F. PROJECT HISTORY:
1. Principal originators: Dr. Vikram A. Sarabhai, Dr. K.B. Shah.
2. Date and place of Initiation: July 1963; Ahmedabad, India
3. Overall project purpose: An informal group called the Group for Improvement of Science Education (GISE) was set up at the Physical Research Laboratory. This was a group of school, college and university teachers and research workers. The group began identifying the institutions and teachers at Ahmedabad who were motivated by the same urge for introducing originality and creativity, both amongst the students and teachers. They met for regular interaction on continuing basis to discuss specific problems and projects which could be implemented in the near future. The Group felt the need of a facility where those who wish to teach and those who want to learn can come and conduct basic experiments and be exposed through audio-visual and other means to the latest development of science, science teaching and technology. To fulfill this need, GISE with the initial financial grant from the Asia Foundation created the Community Science Center in June 1966.

G. PRESENT COMMERCIAL AFFILIATIONS: Anada Book Depot (Publishers), Gandhi Road, Ahmedabad-1, India; Dynam Engineering Corporation (Manufacturers of scientific instruments), 6 Haudin Road, Bangalore, 1, India.

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1. Consultant services available for teachers using the materials: None except through correspondence with headquarter staff.
2. Activities conducted for pre-service and in-service teacher training: An inservice institute of about 5 weeks duration is held at the headquarters for teachers and teacher-trainers from all over India: all participant costs (approximately $250) are met by central agencies and through foreign aid. Free board, lodging, books, etc., are provided. Two more institutes are planned next year.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated: No. A systematic evaluative programme is planned for grade six in ten schools in Bombay beginning June 1970.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: Specific and general goals are defined. Unit tests and achievement tests have been prepared and given to pupils in the five schools. Feedback data has been used to improve materials.

T. PROJECT PUBLICITY:

1. The Times of India - Oct. 25, 1966.
2. Vigyan Shikshak - Jan-March 1969.
3. Indian Public Schools Conference, Annual meeting Feb. 1968.
4. Instrument India - Feb. 1970.
5. Teaching - March 1970.
6. N.C.S.E. Agenda - March 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

April 1970: Institute for teachers and educators in the Bombay school system leading to systematic trial in ten schools from June 1970.
May 1970: Institute at the headquarters.
Jan.1971: Institute for teachers from English medium schools leading to systematic trials in twenty-five schools from Jan. 1971.

H. PROJECT OBJECTIVES:

1. To promote among students, teachers and lay public:
   (a) an understanding of fundamental concepts involved in the physical and biological sciences and mathematics;
   (b) the acquisition of scientific knowledge and insight as far as possible by the process of inquiry through experiment, audio-visual media and other means,
   (c) the ability to solve problems.
2. To stimulate interest, encourage and expose the principles of science and scientific method to elementary, secondary and college students, teachers and the general public.
3. To be concerned with the role of education and ways of improving education in relation to the individual and the community as a whole.
4. To help make clear the social implications of science and technology.

Unique Characteristics:

1. It is a non-profit, non-government institution set up as a local initiative to integrate the efforts of motivated individuals and institutions in the improvement of science education.
2. It is a forum of free exchange of ideas and experiences without any governmental red-tape.
3. The Center emphasizes and provides adequate facilities for the participants to prepare and produce audio-visual content material.
4. It has paved new paths for changing the State written syllabi. Initiating as small projects, the Center prepares new syllabi based on active thinking of practising teachers, tries them out in a number of institutions and eventually submits final proposals to the State Government.
5. It provides an example of how local enthusiasm can be channeled into independently producing something concrete and usable.
6. It also provides a good model for disseminating new ideas and approaches in learning and teaching developed by national and international organizations.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups, Inquiry method.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Biology, chemistry, mathematics, physics, and audio-visual techniques; grade - elementary to university level; age - 10+ onwards; ability levels - no restrictions.

K. MATERIALS PRODUCED:

Publications:

1. Statement of objectives and procedures of the Community Science Center.

2. Observations and suggestions for improvement of science education in India, arising from the study tour report of Dr. K.B. Shah, Director, Community Science Center.
3. Text-book of Algebra for standard (VIII) (In Gujarati) (3rd edition).
4. Teachers' guide for School Algebra project (In Gujarati).
5. Film - How it Happens.
6. Field trip for Science Education.
7. Refresher course in Biology.
8. Using AV Techniques for Science.
9. Teacher Orientation.
10. At the Core of Science is You.
11. Refresher Course in Mathematics.
12. Beyond the Human Eye.
13. Seminar - Science and Community.
14. New Mathematics in Gujarat (Project Report).
15. Staff Orientation Programme.
16. Seeing Big.
17. Gujarati version of "Seeing Big".
18. Introductory Physical Science Course.
19. Gujarati version of "Introductory Physical Science Course".
20. Refresher Course in Chemistry (Part I).
21. Refresher Course in Biology (revised edition).
22. Elementary Mathematics Hand-book (In Gujarati).
23. CSC Newsletter (a publication containing the titles of books in the CSC library).
24. Audio-visual bulletins.
25. Science Learning Through Inquiry.
26. Refresher Course in Chemistry (Part II).
27. Science Films List.

Scientific Apparatus and Teaching Aids:

28. Microscope (low-cost, school level).
29. Hand-drawn slides kit.

Audio-Visual Material - 36 mm. Single Concept Slide Sets:

30. Living and Non-living.
31. What is CSC?
32. Habitat of Plants.
33. Dissection of Frog.
34. Changing of Base.

L. MATERIALS AVAILABLE FREE: Items 1 and 25 from headquarters.

M. MATERIALS PURCHASABLE:

Item 16: Rs. 0.75
Item 17: Rs. 0.75
Item 18: Rs. 2.00
Item 20: Rs. 3.00
Item 26: Rs. 3.00
Item 29: Rs. 3.50
From: Community Science Center, Sanskar Kendra, Ahmedabad-6, India.

Item 22: Rs. 1.00
From: Anada Book Depot, Gandhi Road, Ahmedabad-1, India.

Item 28: Rs. 15.00
From: Dynam Engineering Corporation, 6, Haudin Road,
Bangalore-1, India.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN:
English and Gujarati.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED:
None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. Overhead projector.
2. 36 mm. slide sets on different topics:
    - (a) The Sea.
    - (b) Behavior of Animals.
    - (c) Pollution.
    - (d) How the Sewage Farm Functions.
    - (e) The Sets (magnet board presentation).
    - (f) Technique of Chemical Experiments.
    - (g) Microtomy and Its Method.
    - (h) Story of Evolution.

Q. PROJECT IMPLEMENTATION: Not applicable.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: While projects are in session, the Center organizes special orientation seminars for the teachers using the new materials and special teachers' guides are published for their reference.
2. Activities conducted for pre-service and in-service teacher training: The Center organizes every year a number of in-service teacher training courses in biology, chemistry, mathematics and physics; laboratory, workshop and audio-visual techniques. These courses are organized for the local teachers whose conveyance expenses are paid by their institutions while the expenses towards staff, materials and stationary are met from the CSC fund.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: In the Gujarati language: Item 4, Rs. 0.75 and Item 22, Rs. 1.00. In the English language: Item 8, free of cost; item 20, Rs. 3.00; item 26, Rs. 3.00; item 21, free of cost; item 25, free of cost.

S. PROJECT EVALUATION: The mathematics project undertaken by the Center during 1964-1967 has been internally evaluated. This study is published as a report entitled "New Mathematics in Gujarati". There has been no evaluation of the over-all activities of the Center.

T. PROJECT PUBLICITY:

1. School Science (December 1963), (2) Saraswat (March 1966).
2. Science Resource Letter (Vol. 2, No. 1 - November 1967).
3. The Asia Foundation Quarterly Report (November 1967).
4. Souvenir publication - 6th Convention of Indian Chemical Society (1968).
5. The British Council Science Education Newsletter No. 10 (July 1969).
6. Economic Times (January 20, 1969).
7. The Hindustan Times (January 19, 1969).
8. Science Education in Gujarat (Published for participants of Gandhi Centenary International Conference on Science, Education and Non-violence held in October 1969 at Ahmedabad)

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:
The Center plans to continue and expand its activities.

A. PROJECT TITLE: DEVELOPMENT OF CURRICULUM IN SCIENCE AND MATHEMATICS.

B. PROJECT DIRECTOR: Dr. D. Kothari, Chairman; Dr. M.C. Pant, Director; Mr. Rajendra Prasad, Co-ordinator. Department of Science Education, National Institute of Education, National Council of Educational Research and Training, Sri Airobindo Marg, New Delhi - 16, India.

C. PROJECT HEADQUARTERS:
1. Contact: Shri Rajendra Prasad, Co-ordinator.
2. Special facilities or activities available for visitor viewing: The materials, kit and other aids produced by the Project are available in the Department of Science Education for viewing and studying.

D. PRINCIPAL PROFESSIONAL STAFF: The project is distributed in a large number of universities and centres of higher learning all over the country. The 18 centres are headed each by a director who is a scientist of eminence and each study group has associated with it some persons at the leader's level. some at lecturer's level and some at teacher's level besides other supporting clerical staff and artists. The following are the directors of the study groups:

Physics:
Dr. V.G. Bhide, National Physical Laboratory; Dr. B.L. Saraf, University of Rajasthan; Dr. S. Chatterjee, Saha Institute of Nuclear Physics; Mr. B.G. Pitre, The Doon School.

Chemistry:
Prof. N.V. Subba Rao, Osmania University; Dr. R.C. Paul, Panjab University; Dr. H.J. Arnikar, University of Poona; Father L.M. Yeddanapalli, Loyola College; Prof. R.D. Patel, Sardar Vallabh Bhai Vidyapeeth.

Biology:
Dr. T.S. Sadasivan, University of Madras; Prof. P.N. Mehra, Panjab University; Dr. Sivatosh Mookerjee, Presidency College; Dr. M.R. Suxena, Osmania University.

Mathematics:
Dr. J.N. Kapur, Institute of Technology, Kanpur; Prof. Shanti Narayan, Hans Raj College; Prof. K. Venkatachaliengar, Retired Professor of Mathematics, Bangalore; Dr. G.C. Patni, Jadavpur University; Dr. D.K. Sinha, Jadavpur University.

E. PROJECT SUPPORT:
1. Organizational agency: Not answered.
2. Funding agency: National Council of Educational Research and Training.

F. PROJECT HISTORY:
1. Principal originator: Consequent upon the report of the Secondary Education Commission which in a way laid the policy statement for science education and which was set up by the

Government of India, it was thought necessary to involve the research scientists and the teachers alike in the question of making a critical analysis of the situation in the country with regard to school education in science and to prepare curricular materials such as textbooks, guides, manuals, kits, teaching aids, and back ground reading. As a result, study groups were established under the charge of directors, whose names and addresses have been given above. One of the directors, as indicated, was to be the convener of the groups in a particular subject and the groups were expected to work together in a co-ordinated manner to produce the required materials.

2. Date and place of Initiation: January 1967; New Delhi.

3. Overall project purpose: This curriculum project was undertaken to bring the frontiers of science education in this country in line with other developed countries. After the curricular materials have been tried out and made useworthy, they are to be introduced in the schools of the country as such or with as much adaptation as the states may deem necessary to suit individual variations.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:

This project is different from others in having established a forum where the research scientists and the school teachers are sitting together to evolve a science teaching programme for the school level which in turn may reflect in the modification of teaching programmes at the graduate and the postgraduate levels. Wide distribution of the study groups in a large number of universities and centres of higher learning enables us to enlist the participation of a wide spectrum of educationists from the various parts of the country. This is likely to take care of the diversities that exist in a big country like India. The wide base that has been created for discussion and evaluation of materials and the participation of various sections of people concerned with education, is likely to produce materials which will suit the needs, temper and climate of the country and ultimately help in bringing about the desired changes.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups, Demonstrations.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Physics, chemistry and biology; 10+ to 16+ years; classes V to X. Mathematics; age 5+ years to 16+ years; classes I to X.

K. MATERIALS PRODUCED:

Physics:

1. Physics Text Grade V.
2. Physics Text Grade VI (at final draft stage).

3. Question and Answer Book Grade V.
4. Demonstration Kit Grade V.

Chemistry:
5. Chemistry Text Grade VI.
6. Chemistry Text Grade VII.
7. Chemistry Text Grade VIII.
8. Chemistry Laboratory Manual Grade VI.
9. Chemistry Laboratory Manual Grade VII.
10. Chemistry Laboratory Manual Grade VIII.
11. Chemistry Teachers Guide Grade VI.
12. Chemistry Teachers Guide Grade VII.
13. Chemistry Teachers Guide Grade VIII.

Biology:
14. Biology Text Grade V.
15. Biology Text Grade VI.
16. Biology Text Grade VII.
17. Biology Teachers Guide Grade V.
18. Biology Teachers Guide Grade VI.
19. Biology Teachers Guide Grade VII.

Background Reading Materials:
20. Life of Insects.
21. Non-Flowering Plants of the Himalayas.
22. Marine Plants.

Mathematics:
23. Arithmetic-Algebra Grade V (printing stage).
24. Arithmetic-Algebra Grade VI (final draft stage).
25. Arithmetic-Algebra Grade VII (final draft stage).
26. Geometry Text Grade V.
27. Geometry Text Grade VI.
28. Geometry Text Grade VII.
29. Geometry Teachers Guide Grade V.
30. Geometry Teachers Guide Grade VI.
31. Geometry Teachers Guide Grade VII.

L. MATERIALS AVAILABLE FREE: No. 1 to 19 and No. 23 to 31 (non-priced publications) but only limited copies of the materials are available. These are essentially experimental and can be obtained from the project headquarters.

M. MATERIALS PURCHASABLE: No. 20, 21 and 22.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: In all the 12 Indian languages.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
   1. Background Reading Materials.
   2. 19 titles - Biology.
   3. 10 titles - Chemistry.

Q. PROJECT IMPLEMENTATION: Try out will start in June 1970 in a limited number of schools.

R. TEACHER PREPARATION:
   1. Consultant services available for teachers using the materials: The National Council of Educational Research and Training will be responsible for the training of master teachers for each state. The State Departments of Education have a special section or department which will take up the orientation of the teachers of the participating schools in a big way in about 50 Centres in this country.
   2. Activities conducted for pre-service and in-service teacher training: The NCERT will organize courses for master teachers and key persons selected from each state and train them for leadership work in organizing training programmes for the teachers of the participating schools.

S. PROJECT EVALUATION: The evaluation of the project is being undertaken currently through an organized try-out of the materials in the field. As such, the evaluation data will not be available until next year.

T. PROJECT PUBLICITY: Only in the N.I.E. Journal and School Science journals which are published by the NCERT.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: The Study Groups have been busy with the task of developing curricular materials and have developed materials for the second phase i.e. the one corresponding to Classes VIII, IX and X. These are being reviewed and improved.

V. PLANS FOR THE FUTURE: Not answered.

A. PROJECT TITLE: EXPERIMENTAL PROJECT ON TEACHING OF SCIENCE AND MATHEMATICS AT THE MIDDLE SCHOOL STAGE.

B. PROJECT DIRECTOR: Dr. M.C. Pant, Head of the Department, Department of Science Education, National Council of Educational Research and Training, N.I.E. Bldgs., Sri Aurobindo Marg, New Delhi 16, India. Telephone: 77601.

C. PROJECT HEADQUARTERS:

1. Contact: N.K. Sanyal, Experimental Project on Teaching of Science and Mathematics at the Middle School Stage, Reader of Science Education, National Council of Educational Research and Training, N.I.E. Bldgs., Sri Aurobindo Marg, New Delhi 16, India. Telephone: 78498.
2. Special facilities or activities available for visitor viewing: A visit to the Central Science Workshop of the Department developing prototypes of new science equipment for the use under the project; a visit to the experimental schools and the demonstration school; and to the Instructional Material Centre for the examination of the printed materials, kits and related teaching aids.

D. PRINCIPAL PROFESSIONAL STAFF: Chemistry: Dr. M.C. Pant, N.K. Sanyal and K.S. Bhandari; physics: Mrs. N. Mitra, K.J. Khurana and Chhotan Singh; biology: Rajendra Prasad, S. Doraiswami, S.L. Rai, G. Raju and S.P. Sharma; mathematics: R.C. Sharma, K.V. Rao, R.C. Saxena, G.S. Baderia and Rameshwar Dayal; Central Science Workshop: B.K. Sharma, A.P. Verma, S.P. Dua, and P. Bhatacharya. UNESCO experts working on this project: Chief Technical Adviser: S.A. Balezin; biology: V.I. Galakhov, and V.M. Galushin; chemistry: L.V. Levchuk; physics: A.A. Tamarin, M.F. Kolpakov; mathematics: B. Brared, V.I. Baulin; workshop: B.I. Bukhalov; audiovisual: Gilbert A. Letourneau; interpreter: R.A. Abulkhanov.

E. PROJECT SUPPORT: National Council of Educational Research and Training, New Delhi and UNESCO.

F. PROJECT HISTORY:

1. Principal originator: Department of Science Education, National Council of Educational Research and Training, New Delhi.
2. Date and place of Initiation: September 1965; New Delhi.
3. Overall project purpose: To effect a qualitative improvement in science education at the middle school level by undertaking a pilot study for developing curricular materials for improved science and mathematics instruction at the middle stage of the secondary school as recommended by the UNESCO Planning Mission.

G. PRESENT COMMERCIAL AFFILIATIONS: None but the published materials are available from the NCERT. Publication Unit Sales Wing, N.I.E. Campus, Sri Aurobindo Marg, New Delhi 16.

H. PURPOSES AND OBJECTIVES: The general science approach to the teaching of science which is at present followed at the middle school stage in Indian schools has not proved successful due to a number of reasons. The achievement at the end of the secondary school in science and mathematics has remained rather low as compared to the developed countries. With a view to remedying the above defects and to achieving higher standards of science and mathematics instruction at the secondary stage, a new programme of teaching science as individual disciplines has been attempted under this project to develop a compulsory course of science and mathematics for all the students at the middle stage of school education; to develop new syllabi, text materials, teachers' guides, laboratory experiments and equipment for teaching science as individual disciplines of physics, chemistry, biology and mathematics from the very beginning of the middle stage of school education instead of the present programme of teaching science as 'general science'; to develop a complete package programme covering the students text material, curriculum guide, teachers' guide, equipment and laboratory instructions and audio-visual aids; to develop materials for short-term training/refresher courses for teachers to teach effectively the new materials and to conduct pilot training courses for teacher educators also.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Investigatory Approach Through Experiments.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Biology, physics, chemistry, mathematics; grades 6-8; age levels 12-14.

K. MATERIALS PRODUCED:

Textbooks:

1. Physics - Part I,II and III (English).
2. Physics - Part I, II and III (Hindi).
3. Biology - Part I, II and III (English).
4. Biology - Part I, II and III (Hindi).
5. Chemistry - Part I and II (English).
6. Chemistry - Part I and II (Hindi).
7. Arithmetic Algebra - Part I, II and III (English).
8. Arithmetic Algebra - Part I, II and III (Hindi).
9. Geometry - Part I, II and III (English).
10. Geometry - Part I, II and III (Hindi).

Teachers' Guides:

11. Arithmetic-cum-Algebra - Part I (English).
12. Geometry - Part I (English).
13. Physics - Part I (English).
14. Biology - Part I (English).

CURRICULUM GUIDES:

15. Arithmetic-cum-Algebra - Part I (English).
16. Geometry - Part I (English).
17. Physics - Part I (English).
18. Biology - Part I (English).
19. Syllabus of various subjects of the Experimental Project.

Trial Teachers' Guides:

20. Physics - Part II and III (English).
21. Chemistry - Part I and II (English).
22. Biology - Part II and III (English).
23. Arithmetic cum Algebra II and III (English).
24. Geometry II and III (English).

Equipment and Kits Developed:

Physics Kits:

25. A complete demonstration kit for class VI. Consisting of 85 items.
26. An additional kit in Physics for class VII, consisting of 58 items.
27. A similar additional kit for physics for class VIII, consisting of 52 items.

Chemistry Kits:

28. A complete kit for students for classes VII & VIII, consisting of 26 items.

Biology Equipment:

29. Ten items for class VI.
30. Nine items for class VII.
31. Four items for class VIII.

Mathematics Equipment:

32. Nine items for class VI.
33. Eight items for class VII.
34. Seven items for class VIII.

L. MATERIALS AVAILABLE FREE: Limited copies of all the above publications (No. 1-24) can be obtained from the project headquarters.

M. MATERIALS PURCHASABLE: Items 1 to 10 are purchasable from the Publication Unit of the National Council of Educational Research and Training, N.I.E. Bldg., Sri Aurobindo Marg, New Delhi 16, India.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hindi and English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Twelve State Governments have adopted or adapted these materials and are translating them into their regional languages for purpose of a tryout.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Training materials for teachers in each subject; detailed specifications of the equipment developed in the Central Science Workshop; teaching aids e.g. filmstrips, charts; slides; informative materials for science teachers.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: About 75 teachers for the trial materials and over 1100 teachers in the schools where the first and second part are being used on regular basis.
2. Number of students involved: About 3000 in the experimental schools in Delhi and approximately 7500 students in 118 central schools where the first and second part is being used on a regular basis outside Delhi.
3. Number of schools involved: 30 schools for experimental purposes in Delhi and about 118 central schools located in various parts of the country for regular use of part I and II of the materials.
4. Total number of teachers using any of the materials: About 2000 teachers.
5. Are the totals stated in 1, 2, 3 and 4 estimated or definitive? The numbers stated for experimental schools has been actually calculated whereas those in schools outside Delhi are only approximations.
6. Name and location of selected schools where the course is being taught: Write to project headquarters for list.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Periodic meetings with the teachers of experimental schools and visits by the project staff to the schools located in Delhi and in the other states.
2. Activities conducted for pre-service and in-service teacher training: The in-service course for the teachers of experimental schools is conducted in the summer vacation for a period of 4 to 5 weeks. For other schools the respective Directorates of Education organize in-service courses.
3. Available pre-service and in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? A team of experts from UNESCO has made one progress evaluation.
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished research: Not answered.

T. PROJECT PUBLICITY: Not answered.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Development of all materials for class VIII (the third year of the project) have been completed. The revision of the text materials and teachers guides has been taken up. Work of evaluating these materials as they are being used in the schools is in progress. The materials tried out under this experimental project are being disseminated in various states of India; some of the states have adopted the materials prepared while others are adapting them.

V. PLANS FOR THE FUTURE: The next phase of this project is development of curricular materials for secondary stage in all the science subjects and in mathematics. Simultaneously, steps will be taken to extend these materials to various states and union territories of India.

A. PROJECT TITLE: PHYSICS STUDY GROUP.

B. PROJECT DIRECTOR: Prof. Santimay Chatterjee, Director, Physics Study Group, Saha Institute of Nuclear Physics, 92 Acharya Prafulla Chandra Road, Calcutta 9, India. 35-4281.

C. PROJECT HEADQUARTERS:
1. Contact: Asok Kumar Sinha, Physics Study Group, Saha Institute of Nuclear Physics.
2. Special facilities or activities available for visitor viewing: Visitors can see the text materials and experiments developed by the group.

D. PRINCIPAL PROFESSIONAL STAFF: Professor Santimay Chatterjee, Professor Ananda Mohon Ghose, Mr. Hirendra Kumar Basu, Mr. Asok Kumar Sinha, Mrs. Binapani Ghosh.

E. PROJECT SUPPORT:
1. Organizational agency: National Council of Educational Research & Training, New Delhi.
2. Funding agencies: None.

F. PROJECT HISTORY:
1. Principal originators: Department of Science Education, National Council of Educational Research & Training, New Delhi.
2. Date and place of Initiation: September, 1966; Saha Institute of Nuclear Physics.
3. Overall project purpose: To prepare curricular and guide materials in physics for middle level schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: While the study of science through investigative type of approach has many commendable features, its cost is prohibitive especially for developing countries. Further, there is also a dearth of good teachers necessary for the former type of curricula. We are therefore developing a new approach which is self-instructional and in which basic concepts are introduced through experiments which are compatible with economic and social conditions prevalent in the country.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Self-instructional method.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Physics; class V to VIII; age group - 10+ to 14+.

K. MATERIALS PRODUCED: Text book - School Physics, Vol. I.

L. MATERIALS AVAILABLE FREE: Mimeographed copy of the text book.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Bengali.

P. ADDITIONAL MATERIALS BEING DEVELOPED: School Physics - Vol. II and III.

Q. PROJECT IMPLEMENTATION: Not yet implemented in any school.

R. TEACHER PREPARATION: None at present.

S. PROJECT EVALUATION: Not applicable.

T. PROJECT PUBLICITY: Not answered.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Not answered.

A. PROJECT TITLE: AGRICULTURE AS RURAL SCIENCE PROJECT.

B. PROJECT DIRECTOR: A. Blum, Project Director, Curriculum Center, Ministry of Education and Culture, Jerusalem, Israel.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Experimental classes using project materials; samples of equipment are on display in project headquarters.

D. PRINCIPAL PROFESSIONAL STAFF: A. Blum; E. Elazer; A. Halevy, Scientific Advisor; B. Feinstein; B. Leshem; A. Lewy, Evaluation Specialist; Writing Teams and Advisory Committee. (Chairman: E. Jungwirth)

E. PROJECT SUPPORT:
1. Organizational agencies: Israel Ministry of Education and Culture.
2. Funding agencies: Israel Ministry of Education and Culture.

F. PROJECT HISTORY:
1. Principal originators: The Ministry of Education and Culture.
2. Date and place of Initiation: 1967; Jerusalem, Israel.
3. Overall project purpose: Need for innovation in the curricula and in teaching methods, keeping up with development of modern agriculture.

G. PRESENT COMMERCIAL AFFILIATIONS: "Yachtav", Israel Publishers Association, Tel Aviv.

H. PROJECT OBJECTIVES: Agriculture is seen as applied biology and as the endeavour of man to manipulate ecologic factors (under certain restrictions) to suit his needs. Theory, field and laboratory work are interwoven. Objectives are the stimulation of an experimental approach to problem solving, the ability to use different sources and forms of information, positive attitudes towards agriculture, and the dignity of work and rural life. The objectives are stated and explained in the Introduction to the Teachers' Guide.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups, and Field experiments.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS:
1. "Let's grow plants" - grade 7 or 8: (Course A for Junior High Schools), medium level with additional suggestions for advanced students.

2. "Man interferes in Nature" and "The Bee and Man" - grade 9; (Course B for Junior High Schools)

K. MATERIALS PRODUCED:
1. "Let's Grow Plants" - students' text (Hebrew).
2. Work sheets to Item 1 (Hebrew).
3. "Let's Grow Plants" - students' text and work sheets (Arabic).
4. Teachers' Guide to Items 1 and 2.
5. Laboratory Kit to Item 1.
6. Catalogue of materials and equipment needed for item 1 (Hebrew and English).
7. Blueprints for the planning of land laboratories.
8. "Man Interferes in Nature" - students' text (Hebrew), first trial edition.
9. "The Bee and Man" - students' text (Hebrew), first trial edition.
10. Laboratory equipment for items 8 and 9 (under try-out).
11. Tests on the attainment of cognitive and affective objectives (see also under S).

L. MATERIALS AVAILABLE FREE: Items 3, 6 and 7. From project headquarters.

M. MATERIALS PURCHASABLE: Items 1, 2 and 4, from commercial publisher.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hebrew.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: An Arabic translation is used as trial material for further adaption to special cultural needs of Arab students.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: "Let's Grow Plants" - 125.
2. Number of students involved: 5,000.
3. Number of schools involved: 125 and 4 teacher training institutions.
4. Total number of teachers using any of the materials: "Let's Grow Plants" is given as a complete course in Junior High Schools.
5. Total number of students using any of the materials: 5,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Reported by State Supervisor.
7. Name and location of selected schools where the course is being taught: List may be supplied on request.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Visits to schools by project staff and by supervisors, monthly evaluation and discussion meetings of all teachers using new project materials (in 2 or 3 regional groups).

2. Activities conducted for pre-service and in-service teacher training: Summer institute and shorter courses during school vacations (both financed by the Ministry of Education and Culture), monthly meetings. (See R1)

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Additional guidance material is distributed by the projects, in cooperation with the State Supervisor. Teacher training institutions receive trial materials of new courses under development.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies: Not answered.

3. Brief abstract of in-house or unpublished research: Evaluation is based on detailed feedback reports by teachers and visiting staff, achievement tests, attitude questionnaires analysis of students' independent work, teachers' meetings (see R1). Various internal reports were published, summing up the results from achievement tests on different units and on the change of attitudes towards agriculture.

4. Additional evaluative data available to interested individuals: Contact project director.

T. PROJECT PUBLICITY: "Let's Grow Plants", Agriculture as Rural Science, (a pamphlet describing the project, in English), Curriculum Center, Ministry of Education and Culture, Jerusalem, Israel, 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Development of materials for grade 9 (Course B for Junior High Schools). Adaptation of Course A ("Let's Grow Plants") for Arab students. Development of a BSCS block on growth substances, stressing the agriculture applicability.

A. PROJECT TITLE: BIOLOGY FOR THE JUNIOR SECONDARY SCHOOLS (GRADE 7-9).

B. PROJECT DIRECTOR: M. Silberstein, Curriculum Center, Ministry of Education and Culture, Jerusalem, Israel. 28311.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Materials already developed.

D. PRINCIPAL PROFESSIONAL STAFF: Prof. A. Poliakoff - Mayber: Chairman of the Steering Committee; Team Members: R. Ben - Shaul, M. Ben - Paretz, S. Carmel, M. Zaharoni, I. Rozenblum, S. Gottlieb, Y. Avivi, M. Meir. Scientific Consultants: Dr. L. Fishelson, Prof. T. Lorch, Dr. A. Borut, Dr. M. Zur - Namal. Evaluation Specialist: Dr. A. Lewy.

E. PROJECT SUPPORT:
1. Organizational agency: Ministry of Education and Culture.
2. Funding agency: Ministry of Education and Culture.

F. PROJECT HISTORY:
1. Principal originator: Not answered.
2. Date and place of Initiation: September 1966; not answered.
3. Overall project purpose: Renewal of biology teaching in junior secondary schools.

G. PRESENT COMMERCIAL AFFILIATIONS: Not answered.

H. PROJECT OBJECTIVES: Preparation of a course of study in the biological sciences for grades 7-9. The teaching materials will include: Student textbooks, Student workbooks, Teacher's guides, Teacher's handbooks, Evaluation materials, Equipment, Audio-visuals, etc. The project emphasizes heavily ecology topics including mainly local and endemic species.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Seminars, Discussion groups, Invitations for inquiry, Demonstrations, Reading pages.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS:
1. The Animal and his Environment, grade 7.
2. The Plant and the Habitat, grade 8.
3. The Peculiarity of Man and His Intervention in Nature, grades 8-9.
4. Unity Within the Organisms, grade 9.

K. MATERIALS PRODUCED:
  1. The Animal and His Environment.
    (a) Commercial Edition - 1970.
    (b) Student Textbooks, Parts I and II.
    (c) Student Workbooks, Parts I and II.
    (d) Teacher's Guide, Parts I and II.
  2. The Plants and the Habitat. (First trial edition). The first trial edition consists of booklets for students and teachers, every chapter is appearing as a separate booklet.
  3. Life Specimens in Schools: Aquaria. Teacher's Handbook, trial edition.

L. MATERIALS AVAILABLE FREE: Items 2 and 3.

M. MATERIALS PURCHASABLE: Item 1.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hebrew.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Tests for 1 and 2.

Q. PROJECT IMPLEMENTATION:
  1. Number of teachers who have adopted the course: 400 (For grade 7).
  2. Number of students involved: 20,000.
  3. Number of schools involved: 250.
  4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
  5. Name and location of selected schools where the course is being taught: Not answered.

R. TEACHER PREPARATION: There are different teacher training courses implemented by the Ministry of Education and Universities.

S. PROJECT EVALUATION:
  1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
  2. Pertinent published research studies: Not answered.
  3. Brief abstract of in-house or unpublished research:
  A. Lewy and M. Silberstein, Multi-method Evaluation Procedures of Study Material in Biology (in Hebrew). The quality of the chapter "The Water as Life Environment" was studied by (a) classroom observation, (b) analysis of student worksheets, (c) summarizing teacher's apprehension, (d) administering.

  A. Lewy and M. Silberstein, Teachers apprehension about the importance of developing critical thinking. Questionnaires of three different types were administered to teachers to find out what they think about the importance of developing critical thinking within the framework of teaching science.

A. Lewy and M. Silberstein, Achievements in Biology. The outcomes of teaching trial courses in biology have been answered through four multiple choice tests and through a questionnaire which dealt with affective outcomes of the course.

T. PROJECT PUBLICITY: Not answered.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:
1. Preparation of slow-learner edition.
2. Preparation of a series of blocks for learning natural biology.
3. Preparation of the second trial edition of "Plants and the Habitat".
4. Preparation of the first trial edition of "The Peculiarity of Man and His Intervention in Nature".
5. Preparation of auxiliary materials for teacher training, tests, audio-visuals, etc.

A. PROJECT TITLE: BSCS ADAPTATION PROJECT IN ISRAEL.

B. PROJECT DIRECTOR: Professor Alexandra Poljakoff-Mayber, Head, Israeli Science Teaching Centre, The Hebrew University of Jerusalem, Israel.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: In-service training and biological supply centres.

D. PRINCIPAL PROFESSIONAL STAFF: A. Poljakoff-Mayber, Head, Israeli Science Teaching Centre; E. Jungwirth, Educator and evaluation specialist; P. Tamir; S. Glassman; Z. Dubinsky; R. Lazerovitz; E. Even-Han; P. Sivan; Y. Altshuler; E. Feuchtwanger - Supervisors.

E. PROJECT SUPPORT:
1. Organizational agencies: Israeli Science Teaching Centre and the School of Education, The Hebrew University, Jerusalem; The Department of Education, Bar Ilan University; The Ministry of Education, Government of Israel.
2. Funding agency: Ministry of Education, Government of Israel.

F. PROJECT HISTORY:
1. Principal originator: The Ministry of Education, Government of Israel.
2. Date and place of Initiation: 1963, BSCS Yellow Version Adaptation; 1967, Interaction of Ideas and Experiments, Patterns and Processes; Jerusalem.
3. Overall project purpose: Implementing a modern curriculum and upgrading the teaching of high school biology.

G. PRESENT COMMERCIAL AFFILIATIONS: Not answered.

H. PROJECT OBJECTIVES:
1. Less rhetoric of conclusions and more narrative of inquiring and inquiry-stressing laboratory and field investigations.
2. De-emphasizing learning of specific facts in favor of major principles.
3. Developing critical thinking and creativity.
4. Developing new materials specially adapted to local conditions.
5. Retraining of teachers in light of stated objectives.
6. Providing supplies and facilities as required by the new curriculum.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Programmed instruction, Laboratory investigations, Lectures, Discussion groups, Analysis of research papers. Invitations to enquiry, Laboratory blocks.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS:

1. Biology in 9th, 10th, 11th, 12th grades in the Academic Agricultural schools: Yellow version and Interaction of Ideas and Experiments.
2. Patterns and Processes for slow learners; grades 9, 10.

K. MATERIALS PRODUCED:

1-8. Biology - An Inquiry into Life:
  (a) I and II, Unity.
  (b) III, Diversity (Microorganisms).
  (c) IV, Diversity (Plants).
  (d) V, VI, Diversity (Animals).
  (e) VII, Continuity (Heredity).
  (f) VIII, Continuity (Ecology, Evolution, Behavior).
9. Biology Teacher's Handbook (local adaptation with some original materials).
10-12. Patterns and Processes.
13-15. Interaction of Ideas and Experiments.
16. Evaluation in the Biological Sciences by P. Tamir.
17. Lexicon of Biological Terms by H. Lev.
18. List of films available with specific recommendations for classroom use (compiled by S. Glassman).
19. Test Items and Tests.
20. Original Educational Filmloops: Osmosis.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE:

1-8, $1.25 each; Rechgold, Rothchild Blv. 81, Tel Aviv, Israel.
10, 16, 18, $1.50 each; Israeli Science Teaching Center, Hebrew University, Jerusalem, Israel.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN:

1-15: English.
16-20: Hebrew.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED:

1-15, were translated (with modifications) into Hebrew.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. Laboratory Block in Ecology.
2. A Unit on Soil, Water and Plants.
3. A Unit on Reproduction and Regulation in Farm Animals.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 250.
2. Number of students involved: 8,000.
3. Number of schools involved: 80.
4. Total number of teachers using any of the materials: 350.
5. Total number of students using any of the materials: 9000.

6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Conservative estimation.

7. Name and location of selected schools where the course is being taught: Academic: City High School No. 1, Haifa; Naharya High School, Naharya. Agricultural: Agricultural Secondary School, Pardeic Hanna Kibbutz; Cooperative High School, Gush Zrulum, near Haifa.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Visits to schools; consultations in 3 centres: Jerusalem, Bar Ilam (near Tel Aviv), Haifa; supplies and film loans by mail from above centres; correspondence between teachers and supervisors; special project publication, monthly.

2. Activities conducted for pre-service and in-service teacher training:
    (a) Two-weeks preparation course during summer vacation.
    (b) 1-3 weeks summer courses dealing with various topics such as: animal physiology, genetics, ecology, reproduction, biochemistry, biostatistics, etc.
    (c) One day meetings every week in Jerusalem, Tel Aviv and Haifa.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers:
    (a) All materials mentioned above.
    (b) BSCS publications: Teacher Handbooks, pamphlets, etc.
    (c) BSCS single topic films, slides, technique films, etc.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies:
    (a) Jungwirth, E., "Understanding of Science by BSCS Students in Israel", J. Biol. Ed., 2:39, 1968.
    (b) Jungwirth, E., "Active Understanding of the Processes of Science", J. Biol. Ed., 3:45-55, 1969.
    (c) Tamir, P. and Glassman, S., "A Practical Examination for BSCS Students", J. Res. Sci. Teach. *
    (d) Jungwirth, E., "An Evaluation of the Attained Development of the Intellectual Skills needed for 'Understanding of the Nature of Scientific Enquiry' by BSCS pupils in Israel", J. Res. Sci. Teach. *

* to be published.

3. Research to be published:
    (a) Tamir, P. and Jungwirth, E., Opinions and Expectations of BSCS Teachers in Israel.
    (b) Jungwirth, E., Content Achievement in a Process Oriented Curriculum.

4. Additional evaluative data available to interested individuals: Teachers reports, questionnaires and supervisors reports together with test results serve as feedback. A comprehensive report will be published next year.

T. PROJECT PUBLICITY: See S.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Doubling of number of classes and pupils who are studying BSCS biology. Establishing three supply and in-service training centres.

V. PLANS FOR THE FUTURE:
1. Completing publication of "Interaction of Ideas and Experiments" and "Patterns and Processes".
2. Continuing: evaluation, writing special units for agricultural schools, in-service training, supply centres and all other activities.
3. Revising "Biology - An Inquiry into Life".

A. PROJECT TITLE: EXPERIMENTAL CHEMISTRY PROGRAMME FOR SECONDARY SCHOOLS (REHOVOT CHEMISTRY GROUP).

B. PROJECT DIRECTOR: Professor D. Samuel, Isotope Department, Weizmann Institute of Science, Rehovot, Israel.
Telephone: 951721, Ext. 411.

C. PROJECT HEADQUARTERS:
1. Contact: Miss Ilana Eisen, Department of Science Teaching, Weizmann Institute of Science, Rehovot, Israel.
Telephone: 951721, Ext. 2316.
2. Special facilities or activities available for visitor viewing: Experimental classes using programme materials.

D. PRINCIPAL PROFESSIONAL STAFF: D. Samuel (Chairman), R. Ben-Zvi (coordinator), S. Etzioni, A. Hofstein, Z. Karp, Y. Klauss, A. Luz, T. Rager, Y. Silberstein, R. Swan, S. Novick (on leave of absence).

E. PROJECT SUPPORT:
1. Organizational agencies: Weizmann Institute of Science; Israel Ministry of Education.
2. Funding agencies: Israel Ministry of Education; Weizmann Institute of Science; UNESCO.

F. PROJECT HISTORY:
1. Principal originators: Committee for the Promotion of the Teaching of Chemistry in Secondary Schools, originally part of a committee set up by the Ministry of Education under the chairmanship of the late Prof. A. de-Shalit.
2. Date and place of Initiation: 1965; Rehovot, Israel.
3. Overall project purpose: To introduce modern curricula and teaching methods into Israeli high schools.

G. PRESENT COMMERCIAL AFFILIATIONS: "Chemistry for Grade 10" published by David Rechgold, Tel-Aviv.

H. PROJECT OBJECTIVES: Pilot project consisted of Hebrew translation of "CHEM Study" text and lab manual. Specially written chapters on selected topics (such as chemistry of carbon compounds, geochemistry, industrial processes, molecular biology, etc.), are being added. Programme is being revised as a result of experience in pilot project, feedback analysis and success of new curricula in lower grades and in other sciences. Objectives are to develop a lab-oriented chemistry course for (senior) high schools designed to develop appreciation and understanding of scientific activity and thinking in chemistry.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Chemistry: grades 10-12; 15-18 year old; average ability.

K. MATERIALS PRODUCED:
1. Text - Part I (CHEM Study Chapters 1-9, 11) discontinued.
2. Text & Laboratory Manual, Part II (CHEM Study Chapters 10, 12-17).
3. Text - Laboratory Manual - Chemistry of Carbon Compounds.
4. Text & Laboratory Manual Part IV (CHEM Study Chapters 19-23).
5. Laboratory Manual Part I - discontinued.
6. Chemistry for Grade 10.
7. Teachers Guide for Chemistry for Grade 10.
8. Text - Chapters on Equilibrium (CHEM Study Chapters 9 & 11).

L. MATERIALS AVAILABLE FREE: Items 1, 2, 3, 4, 5, 8 available from the Department of Science Teaching, Weizmann Institute of Science, Rehovot, Israel.

M. MATERIALS PURCHASABLE: Item 6 (IL 5) and 7 (IL 5) available from Science Teaching Department, Weizmann Institute of Science, Rehovot, Israel.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hebrew.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Revised
1. Revised text - Chemistry of Carbon Compounds.
2. Teachers Guide for Chemistry of Carbon Compounds.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 35.
2. Number of students involved: 1500.
3. Number of schools involved: 28.
4. Total number of teachers using any of the materials: 40.
5. Total number of students using any of the materials: 3500.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Herzliyah H.S., Tel-Aviv; Rehovot H.S.; Rishon le Zion H.S.; Municipal H.S. 4, Tel-Aviv; Kibbutz Moaz Hayim H.S.; Holon H.S.; Kibbutz Karbi H.S.; Bnei Akiva Yeshiva H.S., Beersheba H.S., "Aleph".

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Staff at the Weizmann Institute.

2. Activities conducted for pre-service and in-service teacher training: In-service training courses in Jerusalem, Tel-Aviv; summer courses on selected topics given at the Science Teaching Department at Weizmann Institute of Science.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: All written materials available for teacher training; CHEM Study films available from municipal pedagogical centres. Laboratory apparatus from commercial sources.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? It is being evaluated by Mr. J. Pfeffer and Dr. B. Choppin, UNESCO consultant on evaluation.
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished research:
(a) Teachers reports (in Hebrew).
(b) Progress Report No. 1 (in English), 1967 by S. Novick.
(c) Progress Report No. 2 (in English), 1969 by S. Novick and D. Samuel.

T. PROJECT PUBLICITY:
Samuel D., "Why Study Chemistry at School?", Rehovot, Winter Issue 1966/67.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Completion of translation of CHEM Study; first school leaving examination (grade 12) held in July 1969; new book "Chemistry for Grade 10" published commercially and sold on open market.

V. PLANS FOR THE FUTURE: 1970 English reader for laboratory technicians schools; 1971 selected topics for grade 12 (industrial processes, environmental chemistry); 1973 new chemistry course for grades 11-12.

A. PROJECT TITLE: MODERN MATHEMATICS FOR SCHOOLS.

B. PROJECT DIRECTOR: Michael Maschler, Professor, Department of Mathematics, The Hebrew University of Jerusalem, Jerusalem, Israel.

C. PROJECT HEADQUARTERS:
1. Contact: Israel Science Teaching Centre, Hebrew University, Jerusalem, Israel.
2. Special facilities or activities available for visitor viewing: Not answered.

D. PRINCIPAL PROFESSIONAL STAFF: Zvi Altschuler.

E. PROJECT SUPPORT:
1. Organizational agency: Israel Science Teaching Centre.
2. Funding agency: Not answered.

F. PROJECT HISTORY: Not answered.

G. PRESENT COMMERCIAL AFFILIATIONS: Am Oved Publishers, Tel-Aviv.

H. PROJECT OBJECTIVES: Israel has recently adopted a reformed education program at all levels and in particular for grades 7-9. Curricula are being prepared, texts are written and teachers are undergoing various training programs. This project is intimately connected with this development, and its objective is to advance the reform movement in all of its phases. A special emphasis is being given to the particular problems of the mathematics instruction at the Kibbutzim.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Lectures, Seminars, Discussion groups, Courses for teachers, Meetings with teachers.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics, average students, grades 7-9.

K. MATERIALS PRODUCED:
Algebra for 7th Grade.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: Item 1, from Am Oved Publishers, Tel Aviv, Israel. 6.50 IL.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hebrew.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Algebra for grade 8.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: About 160.
2. Number of students involved: About 5000.
3. Number of schools involved: About 160.
4. Total number of teachers using any of the materials: About 250.
5. Total number of students using any of the materials: About 2500.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Educational Institute of the Shomer Hatzair, Mevo'ot HaNegev, Israel; Regional School of K'Far Blum, Upper Galilee, Israel.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Regular weekly meetings; correspondence; visits by more experienced teachers.
2. Activities conducted for pre-service and in-service teacher training: a. Workshops are held in the summer. b. Teachers meet regularly about once a month to discuss text and learn more mathematics. c. Classes are visited by more experienced teachers. d. Teachers attend a regular course in algebra and geometry once a week. These activities are financed by the Kibbutzim movement, the Ministry of Education, and the Center.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Occasionally there is a course for the instructors.

S. PROJECT EVALUATION: Evaluation has not been carried out yet.

T. PROJECT PUBLICITY: None.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Algebra, grade 8, 1970; algebra, grade 9, 1971; probability and statistics; topology; abstract algebra; foundations of analysis.

A. PROJECT TITLE: PHYSICS-CHEMISTRY PROJECT.

B. PROJECT DIRECTOR: Dr. Ruth Ben-Zvi, Nathan Orpaz, Curriculum Center, Ministry of Education, Jerusalem, Israel.

C. PROJECT HEADQUARTERS:
1. Contact: Physics-Chemistry Project, Curriculum Center, Ministry of Education and Culture, Jerusalem, Israel.
2. Special facilities or activities available for visitor viewing: Trial classes during the school year (Sept - June).

D. PRINCIPAL PROFESSIONAL STAFF: Prof. S. Ofer, Hebrew University; Dr. Shmuel Mardix, Hebrew University; Yitzhak Tsillag, Rehovot; Paul Vardin, Jerusalem; Moshe Ben-Dov, Tel Aviv University; Simcha Gottlieb, Tel Aviv.

E. PROJECT SUPPORT:
1. Organizational agency: Ministry of Education.
2. Funding agency: Ministry of Education.

F. PROJECT HISTORY:
1. Principal originator: Dr. Ruth Ben-Zvi.
2. Date and place of Initiation: January 1, 1967; Jerusalem, Israel.
3. Overall project purpose: Combined physics-chemistry project for grades 7 to 9.

G. PRESENT COMMERCIAL AFFILIATIONS: Publisher: "YACHDAV" United Publishers Co., Tel Aviv, Israel.

H. PROJECT OBJECTIVES: In the proposed course, the attempt is made to show the interaction between Experiment and Hypothesis in the development of a scientific theory. The curriculum is based on experiments carried out by the pupil. He arrives at conclusions based on these experiments and sees how observed facts fit in with those theories and hypotheses which were developed to explain these facts.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Physics-Chemistry; grades 7 to 9; age group 12-15.

K. MATERIALS PRODUCED:
1. 7th Grade Course, "The Structure of Matter", in Hebrew text, workbook, teachers guide, catalogue of apparatus.
2. 8th Grade Course, Trial edition of the first four chapters in Hebrew.
3. "The Structure of Matter", Descriptive booklet in English.

L. MATERIALS AVAILABLE FREE: "The Structure of Matter". From: Curriculum Center, Ministry of Education, Jerusalem, Israel.

M. MATERIALS PURCHASABLE: Not answered.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hebrew.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None at present.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
   1. Continuation of 8th grade course.
   2. 9th grade course.
   3. Additional reading materials and audiovisual aids.

Q. PROJECT IMPLEMENTATION:
   1. Number of teachers who have adopted the entire course: 260-300.
   2. Number of students involved: 26,000.
   3. Number of schools involved: 260.
   4. Total number of teachers using any of the materials: 300.
   5. Total number of students using any of the materials: 27,000.
   6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive: Estimated.
   7. Name and location of selected schools where the course is being taught: Eighth grade course is being tried out now in six schools in Tel Aviv and Jerusalem.

R. TEACHER PREPARATION:
   1. Consultant services available for teachers using the materials: Science inspectors are consultants for teachers. Local pedagogical centers exhibit apparatus.
   2. Activities conducted for pre-service and in-service teacher training: Pre-service, special courses for trial class teachers. In-service, weekly meetings at pedagogical center.
   3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:
   1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
   2. Pertinent published research studies: Summaries and analysis of tests by evaluation group of the curriculum center directed by Dr. Arie Lewy.
   3. Brief abstract of in-house or unpublished research: Preliminary reports have been published in Hebrew.
   4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: None in English.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Commercial edition of 7th grade course; development and tryout of 8th grade course; outline of 9th grade course.

V. PLANS FOR THE FUTURE:

1. Eighth Grade Course, Commercial Edition.
2. Ninth Grade Course, Trial Edition.

A. PROJECT TITLE: PROJECT NETA: SECTION FOR 7TH GRADE BIOLOGY FOR HETEROGENEOUS CLASSES CONTAINING CULTURALLY DEPRIVED STUDENTS (BIOLOGY FOR CULTURALLY DEPRIVED).

B. PROJECT DIRECTOR: Director of Project NETA: Dr. Moshe Smilansky, Department of Educational Sciences, Shaaret Building, University of Tel Aviv, Ramat Aviv, Israel. Director of Biology Section: Dr. Eugene Kaplan, Biology Department, Hofstra University, Hempstead, New York 11550. (516)560-3262.

C. PROJECT HEADQUARTERS:

1. In U.S.A. contact: Dr. Eugene Kaplan.
   In Israel contact: Mrs. Naama Sabar, Room 305, Shaaret Building, Tel Aviv University, Ramat Aviv, Israel.
2. Special facilities or activities available for visitor viewing: Demonstration classes (in Hebrew); written materials (some in English) consisting of try-out lessons.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. Eugene Kaplan, Director of Biology Section; Naama Sakar, Assistant Director of Biology Section; Bilha Nachlieli, Writer; Nitza Mirsky, Writer; Ruth Zuzofsky, Writer; Menacham Kaplan, Writer.

E. PROJECT SUPPORT:

1. Organizational agencies: Ministry of Education, Israel; Van Lear Foundation, Holland; UNESCO.
2. Funding agencies: Ministry of Education, Israel; Van Lear Foundation, Holland; UNESCO.

F. PROJECT HISTORY:

1. Principal originator: Dr. Eugene H. Kaplan.
2. Date and place of Initiation: September 1968; Tel Aviv University.
3. Overall project purpose: To develop a curriculum in aquatic ecology for grade 7 which will serve the needs of highly advantaged, average and culturally deprived students in a heterogeneous classroom.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: This project incorporates a self-teaching approach wherein the students are given three alternative tracks to follow depending on ability and motivation. No penalty is incurred by the slowest group. Teacher-lectures are down graded and the teacher's introduction is augmented by a story, a "concept-list" and a programmed lesson, so that students are exposed to four different methods of covering the same materials. Enrichment lessons are provided for the average and above average students.

Each unit includes:

1. Multi-media teacher introduction.
2. Story.
3. Concept List.
4. Problem-solving Laboratory.
5. Programmed Lesson.
6. Enrichment Story.
7. Enrichment Activity (can be done in class or at home).

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Lectures, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Aquatic ecology; grade 7; all ability levels with special emphasis on the culturally deprived.

K. MATERIALS PRODUCED:

1. Assumptions for Preparation and Adaptation of Curricula and Media for the Culturally Disadvantaged - M. Smilansky.
2. Design for an Investigation of the Effectiveness of a New Technique for Teaching 7th Grade Biology to Heterogeneous Classes containing Culturally Deprived Students - E. Kaplan.
3. Life Under Water: E. Kaplan, N. Sabar, 1968 (Folio) - in Hebrew (sample lessons available in English). Consists of 5 units of a proposed 15. One unit on physical and chemical properties of water; four units on daphnia and population dynamics.
4. Instructor's Guide for above (Hebrew, samples in English).

L. MATERIALS AVAILABLE FREE: Item 1 and 2, xeroxed sample of preliminary form of sections of 3.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hebrew, some English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: English.

P. ADDITIONAL MATERIALS BEING DEVELOPED: At the end of academic year 1969-70, 12 of 15 chapters will have been written and tried out at least once.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 3 last year, 3 this year.
2. Number of students involved: 200 (1968-69); 200 (1969-70)
3. Number of schools involved: 4 (1968-69); 1 (1969-70).
4. Total number of teachers using any of the materials: 3.
5. Total number of students using any of the materials: 400 (both years).

6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? 3, 4 Definitive; 1, 2, 5 estimated.

7. Name and location of selected schools where the course is being taught: Emek Hefer, Israel (1969-70); Weitzman (1968, 1969); Ramat-Ha'Sharon (1968-69); Or Yehudah (Religious) (1968-69).

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: The assistant director is always available for consultation. She is at the school several times a week.

2. Activities conducted for pre-service and in-service teacher training: Pre-service workshop - 4 hours; in-service workshop - 2 hours per week. Consists of discussion of goals, examples of how to conduct a lesson and performance of laboratories. Teacher feedback sessions. All donated time by teachers and staff members. No cost.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research:
   (a) Publications pertaining to teaching of culturally deprived in Israel available from Dr. M. Smilansky, project NETA Director.
   (b) Unpublished research of Biology Section includes:
      (1) Tests (content) for 5 units. Performance scores on basis of IQ, ethnic origin, socio-economic level.
      (2) Revision of 5 units on basis of above mentioned data.
      (3) Feedback by a team of 3 trained observers on performance on programmed lesson.
4. Additional evaluative data available for interested individuals: None.

T. PROJECT PUBLICITY: Not answered.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

1. Analysis of trial of 12 units (June 1970).
2. Completion of 15 units, January 1971.
3. Modification of whole book to adjust level of reading difficulty to grade 7.
4. Trials 1971, 1972.
5. Publication, 1972 or 1973.

A. PROJECT TITLE: THE TEL AVIV ELEMENTARY SCIENCE PROJECT (TAESP).

B. PROJECT DIRECTOR: M. Feuchtwanger, Tel Aviv University, Physics Department, Tel Aviv, Ramat Aviv, Israel.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Not answered.

D. PRINCIPAL PROFESSIONAL STAFF: M. Feuchtwanger, Project Director, Dr. E. Kaplan, Assistant Director.

E. PROJECT SUPPORT:
1. Organizational agency: Tel Aviv University.
2. Funding agencies: The Ministry of Education, Jerusalem; Israel Science Teaching Center, Jerusalem.

F. PROJECT HISTORY:
1. Principal originator: Tel Aviv University.
2. Date and place of Initiation: 1966; Tel Aviv.
3. Overall project purpose: To work out a curriculum and produce materials for elementary science teaching for grades K-6 keeping up with recent developments.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: To find out: (1) Components of scientific thinking which can be cultivated in early childhood regardless of specific civilization conditions. (2) A collection of elementary knowledge in the sciences that can be used as subject matter for teaching in early childhood and which the children can study through experimentation, observation and other similar ways. The general tendency is one of combining concept-oriented elementary science teaching with behavior-oriented approaches.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Elementary science (physics, chemistry, biology); grades K-6.

K. MATERIALS PRODUCED:

1. Classification	Grade I
2. Vital Needs of Living Things I	Grade I
3. Material Objects	Grade I
4. Vital Needs of Living Things II	Grade II
5. Life Cycles II - The Life Cycle of the Fly	Grade III

L: MATERIALS AVAILABLE FREE: Progress Report, 1969.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hebrew (An English version of the unit "Classification" has been printed)

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. Vital Needs of Living Organisms III	Grade IV
2. Diversity in Living Organisms II	Grade II
3. Life Cycles I (From Seed to Seed)	Grade II
4. Light	Grade III
5. Relationships between Plants and Animals (Symbiosis)	Grade V
6. Animal and Plant Behavior	Grade III

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Not answered.
2. Number of students involved: Not answered.
3. Number of schools involved: Not answered.
4. Total number of teachers using any of the materials: 15.
5. Total number of students using any of the materials: 500.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Definitive.
7. Name and location of selected schools where the course is being taught: Schools in Tel Aviv and vicinity.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: The writers visit the experimental classes and meet with the teachers before and after the class sessions.
2. Activities conducted for pre-service and in-service teacher training: Teachers' workshops during the school year and during vacations.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: The units of the program (see Section K).

S. PROJECT EVALUATION: None.

T. PROJECT PUBLICITY:

1. M. Feuchtwanger, The Tel Aviv University Elementary Science Project - General Considerations.
2. Dr. E. Kaplan, The Organization of the Tel Aviv Elementary Science Project. Will appear in the proceedings of the Junior Science Conference, Rehovot 1969.
3. Progress Report 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: See Sections K and P.

V. PLANS FOR THE FUTURE: Writing of units for grades 3 - 6. (Also see Progress Report 1969)

A. PROJECT TITLE: LABORATORY INSTRUCTION AND TEACHING AIDS IN COLLEGE INTRODUCTORY CHEMISTRY.

B. PROJECT DIRECTOR: B. Tamamushi, Professor, Nezu Chemical Institute, Musashi University, 1-26 Toyotama-kami, Nerimaku, Tokyo, Japan.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Some examples of slide-tape series and 8mm films are available through project director.

D. PRINCIPAL PROFESSIONAL STAFF: Professor N. Inoue, Tohoku University; Prof. S. Takamoto, Gakushuin University; Prof. M. Takebayashi, Osaka University; Prof. Y. Yoshino, University of Tokyo.

E. PROJECT SUPPORT:
1. Organizational agencies: None.
2. Funding agency: The Ministry of Education, Japan.

F. PROJECT HISTORY:
1. Principal originator: Prof. B. Tamamushi.
2. Date and place of Initiation: April 1968; Tokyo.
3. Overall project purpose: To improve college chemistry education.

G. PRESENT COMMERCIAL AFFILIATIONS: None at present.

H. PROJECT OBJECTIVES: To improve laboratory instruction methods and to prepare some new teaching aides in college introductory chemistry, especially for teaching a large number of students. This project is the first trial of the group study at the college-level chemistry in this country.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, Lectures, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Laboratory instruction, college introductory chemistry for future scientists as well as non-scientists.

K. MATERIALS PRODUCED:
1. Some new types of laboratory experiments, such as: Iodmetry applied to keto-enol equilibrium, hydroperoxide analysis and reaction rate of N-chlor-acentanilide; experiments on nucleophilic substitution (unimolecular and bimolecular); experiments on complex compounds (chemical and physical analysis)
2. Slide and tape series for "inorganic semi-micro analysis", "organic preparation", "complex compounds", etc.

3. 8mm films for "chemical balance", "precipitation and filtration", "molecular weight determination", "determination of Avogadro's number."

4. Transparency series for teaching "history of chemistry."

L. MATERIALS AVAILABLE FREE: None at present.

M. MATERIALS PURCHASABLE: None at present.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Japanese - preliminary report, not yet published.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Partly in English, in future.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Not answered.
2. Number of students involved: 2000 science majors, 200 non-science majors.
3. Number of schools involved: 7.
4. Total number of teachers using any of the materials: Not answered.
5. Are the totals stated in 1, 2, 3 and 4 estimated or definitive? Estimated.
6. Name and location of selected schools where your course is being taught: University of Tokyo, Tokyo; Osaka University, Osaka; Tohoku University, Sendai; Tokyo Metropolitan University, Tokyo; Gakushuin University, Tokyo; Musashi University, Tokyo; Tokyo Woman's Christian College, Tokyo.

R. TEACHER PREPARATION: Not answered.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. List of pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: Item K.

T. PROJECT PUBLICITY: Preliminary report of the study group, in Japanese, mimeographed in limited number.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE: The result of the study will be published partly or as a whole, in some technical journals and also reported at any conference concerning the study project.

A. PROJECT TITLE: SPECIAL STUDY OF SCIENCE EDUCATION CONSISTING OF TWENTY-SEVEN SUB-PROJECTS.

B. PROJECT DIRECTOR: Dr. Haruo Ootsuka, 12 Seijo 2, Setagaya-ku, Tokyo 157, Japan. Telephone: 03-416-1984.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Introduction to almost all the researchers of this project and of physics education in Japan.

D. PRINCIPAL PROFESSIONAL STAFF: No professional staff. Executive committee for planning and coordination: Haruo Ootsuka, President, Physics Education Society of Japan; Bunichi Tamamushi, Professor, Musashi University; Michinori Oki, Professor, Faculty of Science, Tokyo University; Yosito Sinoto, Visiting Professor, International Christian University.

E. PROJECT SUPPORT:
1. Organizational agency: Ministry of Education, Japan.
2. Funding agency: Ministry of Education, Japan.

F. PROJECT HISTORY:
1. Principal originator: Council of Science Education, Ministry of Education.
2. Date and place of Initiation: April 1, 1968; Tokyo.
3. Overall project purpose: Reviewing all of the studies in the field of science education in Japan, coordination of the individual studies and preparation for the establishment of the second national three year project in science education research. This is the first three-year national project. For details on sub-projects see synopses.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Exploring to find out the most preferable curricula for various kinds of courses of study and the teaching aids in connection with their philosophy, studying time and expense.
Characteristics: Coordination of representative studies of science education in the school system of Japan.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study (mh), Trial programmed study (h), Laboratory investigations (emh), Lectures (mh), Seminars (h), Discussion groups (em), Trial computer-assisted instruction (em), and Lectures with demonstrations (emh).
"e" - elementary schools.
"m" - middle schools.
"h" - high schools.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS:
Elementary schools: 3rd - 6th grades, 8-11 years old, all levels.
Middle schools: 7th - 10th grades, 12-15 years old, all levels.
High schools: 11th - 13th grades, 16-18 years old, all levels.

K. MATERIALS PRODUCED:
1. Summary report of the Science Education Study, Special Study, Ministry of Education, by H. Ootsuka and others, 1968.
2. Reports from the sub-projects are produced by the sub-groups concerned.

Reports published already are as follows:
1. Study of modernization of chemical education of secondary school level, by M. Oki and group of 14 members.
2. Study of earth science: its fundamental ideas and its teaching process, by K. Watanabe and group of 13 members.
3. Development of teaching aids from the standpoint of educational engineering, by R. Okazaki and 4 collaborators.
4. Development of an effective method of science education by means of teaching machines utilizing an electronic computer, by S. Kobayashi and 10 collaborators.
5. Study of the contents of experiments of chemistry education at the first year of college level, by B. Tamamushi and a group of 11 members.
6. Study of the improvement of the curricula at the elementary and middle school level, by T. Shirai and a group of 20 members.
7. Study with respect to the guidance of learning of science and mathematics in the physico-mathematical course at the high school level, by K. Shiomi and a group of 25 members.

L. MATERIALS AVAILABLE FREE:
1. K-1, available from Dr. Ootsuka's office.
2. Sub-project reports are available from the sub-project group leaders offices.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Japanese.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: English; the summary report and some of the reports of the sub-projects will be translated.

P. ADDITIONAL MATERIALS BEING DEVELOPED: The summary reports of 1970 and 1971 will follow.

Q. PROJECT IMPLEMENTATION: Not yet estimated for the whole project.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Open symposia are scheduled for teachers once a year.
2. Activities conducted for pre-service and in-service teacher training: None for the whole project.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None for the whole project.

Individual sub-groups consider their own implementation method.

S. PROJECT EVALUATION: The entire project has not yet been evaluated.

T. PROJECT PUBLICITY:

N. Ashiba, "Report of the symposium and panel discussion held in October, 1968", Rika Kyoiku Shimbun (Science Education News), No. 118, p. 2, 1969.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:

1. Meetings for coordination of the implementation of the sub-projects in September 1968, and July 1969.
2. Symposium on the reports of investigation of similar foreign projects and panel discussion in December 1968.
3. Symposium on the relation between sciences in the curricula at the high school level in December 1969.
4. Symposium on science education using teaching machines including electronic computers in December 1969.
5. Meetings for reporting the activity during the past year from each sub-project in May 1968 and 1969.

V. PLANS FOR THE FUTURE:

1. Meeting for reporting the sub-projects' activities: March 1970.
2. Meeting for coordination among the sub-projects: July 1970.
3. Symposium on the science education system in Japan: July 1970.
4. Discussion meeting for future study to provide a science education system using multi-media in the fall of 1970.
5. Meeting for reporting the sub-projects' activities: March 1971.
6. Publication of the report of the first three-year-project: April 1971.

A. PROJECT TITLE: SCIENCE TEACHING ENRICHMENT PROGRAMME (STEP).

B. PROJECT DIRECTOR: His Majesty's Government, Ministry of Education, Science Education Centre.

C. PROJECT HEADQUARTERS:

1. Contact: B.P. Upadhya or Peter Cross, Science Education Centre, Harihar Bhawan, Phulchowk, Lalitpur, Nepal.
2. Special facilities or activities available for visitor viewing: Classes and facilities in 18 STEP schools throughout Nepal (5 in Kathmandu Valley most convenient); STEP Office; Science Equipment Centre.

D. PRINCIPAL PROFESSIONAL STAFF: Dilli Raj Upreti, Under Secretary, Ministry of Education; Bhairab Prasad Upadhya, Science Specialist, Science Education Centre; Peter Cross (Peace Corps Volunteer), Coordinator; Madhup Prasad Dhungana, translator; Chuck Bailey (PCV); Tim Maker (PCV) and Paul Wishinski (PCV), office staff.

E. PROJECT SUPPORT:

1. Organizational agency: Ministry of Education.
2. Funding agencies: His Majesty's Government of Nepal; U.S. Agency for International Development; UNESCO/UNICEF.

F. PROJECT HISTORY:

1. Principal originators: Bhairab Prasad Upadhya, Science Specialist; W. Christopher Jeffers (PCV).
2. Date and place of Initiation: December, 1966; Kathmandu, Nepal.
3. Overall project purpose: STEP was begun as an effort by the Ministry of Education to create a comprehensive and effective science education programme for supplanting rote learning with the problem-solving approach in Nepal's secondary schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: STEP's main purpose is to produce students who, by the end of the five year course, will be better able to understand and manipulate the physical and biological aspects of their environment in accordance with their own goals. STEP aims to produce a science course geared to the abilities of Nepal's teachers and students and to the reality of the Nepali environment. To insure the accomplishment of the above goals, STEP has produced a series of lessons based on a guided discovery approach to instill scientific attitudes and teach scientific thought processes (rather than teach a specific content), and attempts to make implementation of these lessons inevitable. When a school is chosen for STEP, 2 or 3 science teachers from the school receive training in the use of the STEP teacher's manual, a series of detailed daily lesson plans including pedagogical and technical background notes. The school is supplied with all the equipment needed to teach the manual (stressing the use of locally available materials) and suitable furniture for a classroom/laboratory (large blackboards, flat-topped desks, storage facilities, etc.). Arrangements are made for classroom renovation or construction, if necessary. Enrollment is limited to 40 students per class section. The teacher's work load is limited to 22 teaching periods per week. Each STEP science class meets 6 times per week. A Peace Corps Volunteer may be assigned to the school to work closely with the STEP-trained teacher. At the present time, a full statement of the STEP objectives is available only in mimeographed form.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Class discussions, Laboratory investigations.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: General science and hygiene/physiology; classes VI-VIII (eventually classes VI-X); ages 10-16; essentially the first and terminal science course for most students.

K. MATERIALS PRODUCED:
1. STEP Class VI Teacher's Manual, revised edition, with units on observation, scientific sketching, matter, magnetism, effects of heating, floating, air, ecology, microorganisms, and the senses.
2. STEP Class VII Teacher's Manual, experimental edition, containing units on weighing, soil, change, heat, water cycle, mosquitoes, and the digestive system.
3. STEP Class VIII Teacher's Manual, experimental edition, containing units on astronomy, electricity, disease, community health, and mechanics.
4. Supplementary student reading materials, laboratory sheets and tests for all above units.

L. MATERIALS AVAILABLE FREE: Teacher's manual individual units (items 1, 2 and 3 above) available directly from STEP, supply permitting.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Nepali.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Teacher's manuals and student reading/laboratory books for Class IX and Class X are presently being prepared. The Class IX units will be generally on topics from physical science, and Class X units will be on topics from biological science. Both these courses will be specifically oriented toward teaching "environmental science."

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 42 Nepali teachers.
2. Number of students involved: 3200.
3. Number of schools involved: 18.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: College of Education Laboratory School; Bhanu Madhyamik Vidyalaya; Patan High School; Padma Kanya Vidyashram; Vidyarthi Niketan High School; all are located in the Kathmandu Valley.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: When a school initiates the program a Peace Corps Volunteer is normally assigned to work in a full-time consulting role for a period of 2-3 years. In addition, staff visits are made to schools.
2. Activities conducted for pre-service and in-service teacher training: Each year 2 two-month training programs are held. Each teacher must attend a total of 5 training sessions (usually 1 per year), each oriented toward preparation for teaching one of the five teacher's manuals, for Classes VI-X. Financing is through His Majesty's Government and UNESCO/UNICEF. Approximate cost per training session is $600.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: A set of standardized teacher training materials for training programs, based on the STEP teacher's manuals, is currently being developed and implemented.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: Teacher's manuals are evaluated from daily lesson evaluation forms submitted by teacher teams, as well as by classroom test results and staff visitation.
4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY:

John Balcomb, "A STEP Forward", UNICEF News, June, 1968.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:

Detailed planning of Class IX physical science course; first drafts of plans for Class X biological science course;

re-orientation of project philosophy in terms of the process approach, and analysis of existing materials in light of this.

V. PLANS FOR THE FUTURE: During the following year STEP will operate two teacher training programs for the first time. The Class IX Teacher's Manual will be completed, including units on general chemistry, milk chemistry, electricity production and use, agricultural soil, conservation, statics, theories of astronomy, and water and health. The Class X curriculum will be finalized, based around the four topic areas of the matter cycle, the energy cycle, heredity-reproduction, and population ecology.

A. PROJECT TITLE: THE CONSTRUCTION OF AN ITEM BANK FOR SECONDARY SCHOOL MATHEMATICS.

B. PROJECT DIRECTOR: Professor Dr. A. D. de Groot, Research Institute for Applied Psychology at the University of Amsterdam, Herengracht 510, Amsterdam, The Netherlands. (020)6 55 21.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Professor Dr. A. D. de Groot, Project Director; J. Timmer, Research Coordinator; M. H. F. van Loon, Project Assistant; N. Stom-Pathuis, Administrative Assistant.

E. PROJECT SUPPORT: The Foundation for Educational Research in the Netherlands.

F. PROJECT HISTORY:
1. Principal originators: Professor Dr. A. D. de Groot and J. Timmer.
2. Date and place of Initiation: August, 1967; Amsterdam.
3. Overall project purpose: To provide multiple choice items for educational purposes to the schools.

G. PRESENT COMMERCIAL AFFILIATIONS: Mouton Publishing Company, The Hague, The Netherlands; Wolters-Noordhoff Publishing Company, Groningen, The Netherlands; J. Muusses Publishing Company, Purmerend, The Netherlands; C. I. T. D. (Central Institute for Test Development) Arnhem, The Netherlands.

H. PROJECT OBJECTIVES: The objective of the project is to construct an item bank for mathematics and to offer these items to the teachers. All items are multiple choice items with four options. These items can be used for guidance and evaluation purpose for the new mathematical curricula in Holland. It is our purpose that every teacher of mathematics can use and try out the items which fit in with his curriculum. In this way we hope to give the discussions about the content of the items and about the objectives a more concrete base.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Not applicable.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics; grades 7-9; age levels 13-15.

K. MATERIALS PRODUCED:
1. Teachers guide for writing multiple choice items for mathematics.

2. Teachers guide for using, scoring, administrating and analysing multiple choice items.
3. Concept item bank with multiple choice items for mathematics.
4. A set of experimental tests.
5. A standardized test for teachers using the Dutch adaptation of the books of the Scottish Mathematics Group.
6. A standardized test for teachers using the textbook "Van A tot Z."
7. A standardized test for teachers using the official program.
8. Interim report of August 1969.
9. An item bank consisting of items which can already be used at the end of grade 7. All items are tried out and listed with psychometrical data.
10. A first issue of the item bank for grade 9.
(Items 5, 6 and 7 can be used at the end of grade 7)

L. MATERIALS AVAILABLE FREE: Item 8 is available from Project Headquarters upon request.

M. MATERIALS PURCHASABLE:
1. Item 1 is now a chapter in the book "Studietoetsen". This book is available from Mouton Publishing Company.
2. Items 5, 7 and 9 are available from Wolters-Noordhoff Publishing Company.
3. Item 6 is available from Muusses Publishing Company.
4. Item 10 is available from C. I. T. D.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Dutch.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: A part of the item bank will be translated in English.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION:
1. How many teachers have adopted the entire course: Not answered.
2. How many students are involved: Not answered.
3. How many schools are involved: 700.
4. Total number of teachers using any of the materials: 2000.
5. Total number of students using any of the materials: 60,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Not answered.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Teachers can contact project headquarters for

information. From time to time courses are organized.
2. Activities conducted for pre-service and in-service teacher training: In some schools special investigations are made for using the materials; these activities are part of the project and financed by the project.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Item 1 and Item 2. A teachers guide for using the standardized tests, will be produced by Wolters-Noordhoff and Muusses Publishing Companies.

S. PROJECT EVALUATION: Psychometric norms will be used for the evaluation of the materials.

T. PROJECT PUBLICITY: The International Newsletter of the Educational Testing Service. The construction of an item bank for secondary school mathematics at grade 9.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: According to an analysis of objectives a great number of items have been written. A part of these items have been tried out at the end of grade 7.

V. PLANS FOR THE FUTURE: The rest of the concept items will be tried out at the end of grade 9 in 1971 and 1972. 1971 is the first year in which there will be pupils taught according to the new mathematical programs.

A. PROJECT TITLE: EXPERIMENTAL CHEMISTRY FOR THE SECONDARY SCHOOL.

B. PROJECT DIRECTOR: Dr. J. de Miranda Tilburg, Economische Hogschool, The Netherlands.

C. PROJECT HEADQUARTERS:
1. Contact: Prof. Dr. J. Koning, University of Amsterdam, Prinsengracht 225-227, Amsterdam, The Netherlands.
2. Special facilities or activities available for visitor viewing: The project is developed in small meetings of teachers.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. H. van Voorde.

E. PROJECT SUPPORT:
1. Organizational agencies: None.
2. Funding agencies: None.

F. PROJECT HISTORY:
1. Principal originator: Dr. J. de Miranda.
2. Date and place of Initiation: 1964; Enschede Technical University.
3. Overall project purpose: To develop a new course in chemistry for high school students based on phenomena and an interpretation of data.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Most of the courses in chemistry all over the world introduce the atomic theory too early. Students then never understand at a later time the hypothetical nature of the concept of the atom; therefore, enough experience with chemical reactions and substances should first be available before beginning with the theory of the atom.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Grades 9-11.

K. MATERIALS PRODUCED:
1. Introduction to Chemistry (stencilled).
2. Several articles on "Faraday" by Dr. J. de Miranda, The Journal of the Dutch Science Teachers Association.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: Contact Dr. J. de Miranda Tilburg, Economische Hogschool, for reprints of item 2.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Dutch.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Dr. H. van Voorde is in charge of course development, experimenting with groups of students in collaboration with groups of teachers.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: Approximately 60.
2. Number of students involved: Approximately 300.
3. Number of schools involved: Approximately 10.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: Contact Dr. de Miranda for this information.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Consultation is done in meetings of groups of teachers.
2. Activities conducted for pre-service and in-service teacher training: No activities at the moment other than some lectures given at meetings.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: Dr. M. van Voorde will publish a research study on the subject, perhaps in 1971.
3. Brief abstract of in-house or unpublished research: Not answered.
4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: See K.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:
Publication of text by Dr. H. van Voorde.

A. PROJECT TITLE: VAN A TOT Z; WERKBOEKEN DER WISKUNDE. (MATHEMATICAL COURSE FOR SECONDARY EDUCATION).

B. PROJECT DIRECTOR: Dr. P.M. van Hiele, 64 Dr Beguinlaan, Voorburg, The Netherlands. Telephone: 070-860555.

C. PROJECT HEADQUARTERS:
1. Contact: H.N. Schuring, 93 Paradijsstraat, Voorburg, The Netherlands. Telephone: 070-986042.
2. Special facilities or activities available for visitor viewing: Not answered.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. Chr. Boermeester, Inspector, secondary education; B. Burger, Headmaster, lower secondary school; Ir. K. Kok, Teacher, first degree, secondary education; H.N. Schurling, Teacher, first degree, secondary education.

E. PROJECT SUPPORT: Not answered.

F. PROJECT HISTORY:
1. Principal originator: Dr. P.M. van Hiele.
2. Date and place of Initiation: 1968; Voorburg, Holland.
3. Overall project purpose: To write a complete course in mathematics for secondary education.

G. PRESENT COMMERCIAL AFFILIATIONS: Publisher: J. Muusses, N.V., Postbus 13, Purmerend, The Netherlands.

H. PROJECT OBJECTIVES: We are writing a course in modern mathematics for use in all types of institutes for general secondary education in The Netherlands, especially comprehensive schools. A new element in our course is that prior to being placed into a special stream all children have to work through a basic program and to supplement this with an additional program for self-determination. Also new is the use of vectors throughout the whole course.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: In The Netherlands general secondary education has been divided into three streams:
1. M.A.V.O. lower general secondary education; this course, 3 or 4 years, is a preparation for medium vocational training. (our booktitle: M^3 and M^4)
2. H.A.V.O. higher general secondary education; this course, 5 years, is a preparation for higher vocational training. (our booktitle: H)
3. V.W.O. A preparation for university, 6 years. (our booktitle: V)

K. MATERIALS PRODUCED:

1. Part 1A and 1B:	Basic course first form.
2. Part 1C:	Additional determination material.
3. Part M4H 2a, M4H 2b:	Basic course second form M.A.V.O.
4. Part H 2c:	Additional determination material for H.A.V.O.
5. Part HV 2a:	Basic course H.A.V.O. and additional determination material for V.W.O.
6. Part HV 4b:	Basic course H.A.V.O., experimental stage.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: Contact publisher.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Dutch.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Part HV 2b; Part M^3 3a and M^3 3b; Part $M^4$3a and $M^4$3b; Part HV3a and HV 3b; Part M^4 4a and M^4 4b; Part H 4a and H 4b; Part V 4a and V 4b; Part H 5a and H 5b; Part V 5a and V 5b; Part V 6a and V 6b.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: About 300.
2. Number of students involved: About 30,000.
3. Number of schools involved: About 200.
4. Total number of teachers using any of the materials: Unknown.
5. Total number of students using any of the materials: Unknown.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Openbaar Dalton Scholengemeenschap, Loolaan 125, Voorburg, The Netherlands.

R. TEACHER PREPARATION: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? No.
2. Pertinent published research studies:
   (a) Dr. D. van Hiele-Geldof, De didaktiek van de meetkunde in de eerste klas van het V.H.M.O.
   (b) Dr. P.M. van Hiele, De problematiek van het inzicht.

3. Brief abstract of in-house or unpublished research: Before we publish a part of our course we have tried this by means of stencils. We try to use modern mathematics in the old examination program, in our lectures at The Openbaar Dalton Scholengemeenschap.

4. Additional evaluative data available to interested individuals: As soon as the next part of our book is published.

T. PROJECT PUBLICITY: None.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: See K.

V. PLANS FOR THE FUTURE:

The new program for teaching mathematics in a modern way has started in Holland in 1968-1969 for the first form. That is why the materials for the third form have to be completed before August 1970, for the fourth form in 1971, and so on.

A. PROJECT TITLE: AIYETORO BASIC SCIENCE PROGRAMME.

B. PROJECT DIRECTOR: Mrs. Mary King Skapski, Coordinator, Research Associate, Comparative Education Study and Adaptation Centre (CESAC), University of Lagos, Lagos, Nigeria.

C. PROJECT HEADQUARTERS:
1. Contact: Chief H.M.B. Somade, Director, CESAC, University of Lagos, Lagos, Nigeria.
2. Special facilities or activities available for visitor viewing: Classes can be visited at the Comprehensive High School, Aiyetoro, Western Nigeria. Housing for visitors is available at the Conference Centre on the school site.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. E.O. Aderinlewo, Chairman, Science Department, Aiyetoro Comprehensive High School (Presently at Harvard University doing post-grad studies); Mr. D. Agbebe, Acting Chairman, Science Department, Aiyetoro Comprehensive High School.

E. PROJECT SUPPORT:
1. Organizational agencies: Science Department, Aiyetoro Comprehensive High School; CESAC, University of Lagos.
2. Funding agencies: The Ford Foundation; Ministry of Education, Western State, Nigeria; U.S.A.I.D. (in the past).

F. PROJECT HISTORY:
1. Principal originators: Chief H.M.B. Somade (then with the Western Region Ministry of Education); Dr. Adam Skapski (first with USAID, then with the Ford Foundation); Dr. Fletcher Watson (Harvard University).
2. Date and place of Initiation: Summer 1962; Ibadan and Lagos.
3. Overall project purpose: To develop a modern science programme appropriate for use in the first two years of Nigerian secondary schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: In the past, science had been taught in an authoritarian, verbalistic manner in Nigerian secondary schools. The objective of this Project was to produce materials, centered around the processes of science, which would teach pupils to accept the evidence of their own senses rather than to rely on authority in the person of the teacher or the book and to engage in independent, critical thinking. Nigeria was just emerging from its colonial past, and it was felt that a science programme of this sort would contribute much toward producing citizens who could participate in a democracy.
The idea of energy transfer (conservation of energy) was chosen as the unifying theme, to emphasize that "you can't get something for nothing" -- the object being to get away from the

tradition of a paternalistic colonial society. The worship of white-collar jobs (another heritage of the colonial system) was to be replaced with respect for working with one's own hands. The desired processes of science (observation, classification induction, deduction, use of mental models, etc.) were chosen first and then subject matter content which could best teach these processes using locally relevant materials and examples was selected. No text is provided, in order to ensure that the pupils learn by the discovery approach. The aims are stated or implied on pages 1 - 4 of "Planning a Basic Science Curriculum...." (see K. 3) and in the Introduction to the Units in the Teacher's Guides. The materials were tried out for several years, with continuous revision, at the Aiyetoro Comprehensive High School before being published in April 1967 for testing on a wider basis. This two-year trial teaching has just been completed, and the materials will be extensively revised this year.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigation.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: General science for Forms I and II (roughly equivalent to American 7th and 8th grades), ages about 11 - 13, all ability levels but taking into consideration the fact that English is a second language for these children. As yet, very little science is taught in primary schools, so this is a first course in science for most of these children.

K. MATERIALS PRODUCED:

1. A Teacher's Guide for General Science for the Comprehensive Secondary School, Form I, by Science Department, C.H.S., Aiyetoro.
2. A Teacher's Guide for General Science for the Comprehensive Secondary School, Form II, by Science Department, C.H.S., Aiyetoro.
3. Planning a Basic Science Curriculum for the Comprehensive Secondary School at Aiyetoro, Western Nigeria by Fletcher Watson and Douglas Roberts, Harvard University.

L. MATERIALS AVAILABLE FREE: All of the above, from CESAC, University of Lagos, Lagos, Nigeria.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: The Teacher's Guides are currently being revised on the basis of feedback obtained during the nation-wide, two-year, trial teaching of the materials which has just ended.

Q. PROJECT IMPLEMENTATION: The figures below include only the official Pilot Schools. A number of other schools have already adopted the program.

1. Number of teachers who have adopted the entire course: 36 at present (there has been a good deal of turnover).
2. Number of students involved: About 2000.
3. Number of schools involved: 24 Pilot Schools.
4. Are the totals stated in 1, 2 and 3 estimated or definitive: Definitive for 1 and 3.
5. Name and location of selected schools where the course is being taught: Adeola Odutola College, Ijebu-Ode; Egba High School, Abeokuta; Egbado College, Ilaro; Ekiti Parapo College, Iddo-Ekiti; Ijesha High School, Ilesha; Mayflower School, Ikenne; Oduduwa College, Ile-Ife; Ogbomosho High School, Ogbomosho; Victory College, Ikare; Edaiken Ahmadiyya Grammar School, Benin City; Hussey College, Warri; St. Malachy's College, Sapele; Government Secondary School, Dekina; Ahmadu Bello Academy, Sokoto, and several government craft schools.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: CESAC members periodically visited the schools during the trial teaching. The science teachers at the Aiyetoro Comprehensive High School welcomed visits from teachers of the pilot schools.
2. Activities conducted for pre-service and in-service teacher training: A conference presenting the materials to a wide educational public was held in April and May 1967. Training conferences for the teachers in the pilot schools were held in January 1968 (Form I) and January 1969 (Form II). The school year in Nigeria runs from January to December, with three four-week holidays. The cost of the January 1969 Training Conference was L1544-7-5 (roughly $4300).
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None as yet.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff at the feedback conference, December 1969.
2. Pertinent published research studies: None as yet.
3. Brief abstract of in-house or unpublished research: Not answered.
4. Additional evaluative data available to interested individuals: None as yet.

T. PROJECT PUBLICITY:

1. Watson, Fletcher G., "The Curriculum in Science for an African School", *Journal of Research in Science Teaching*, Vol. 1, pp. 244-252, (1963).
2. Sorenson, Harley, "The Science Programme at the Comprehensive High School", *The Journal of the Science Teachers' Association of Nigeria*, Vol. 5, No. 1, pp. 22-24, Jan. 1966.
3. O'Grady, Alice R. (Chairman), "Symposium on General Science in Lower Forms of Secondary Schools", *The Journal of the Science Teachers' Association of Nigeria*, Vol. 5, No. 3, pp. 10-13, October 1966.
4. Ryan, J.O., "The Aiyetoro Syllabus", *The Journal of the Science Teachers' Association of Nigeria*, Vol. 6, No. 3, pp. 23-24, October 1967.
5. Ogunnaike, A.O., "The General Science Course at Comprehensive High School, Aiyetoro", *The Journal of the Science Teachers' Association of Nigeria*, Vol. 7, No. 1, pp. 22-26, May 1968.
6. Aderinlewo, Ezekiel O., "Towards a More Functional Science Programme in Nigerian Schools", *The Journal of the Science Teachers' Association of Nigeria*, Vol. 7, No. 1, pp. 28-33, May 1968.
7. Skapski, Mary K., "The Aims of the Aiyetoro Basic Science Programme", *The Journal of the Science Teachers' Association of Nigeria*, Vol. 7, No. 2, pp. 25-28, August 1968.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE: In December 1969, a feedback conference was held in order to evaluate the Programme and suggest desirable changes. This was attended by teachers from 17 of the pilot schools. The Teacher's Guides will be entirely rewritten on the basis of this feedback during the first half of 1970.

A. PROJECT TITLE: PROGRAMMED LEARNING IN SCIENCE AND MATHEMATICS IN A DEVELOPING COUNTRY.

B. PROJECT DIRECTOR: Martyn Roebuck, Programmed Learning Research Unit, The University, Glasgow, W.2., United Kingdom.

C. PROJECT HEADQUARTERS:
1. Contact: T.A. Balogun, Department of Education, University of Ibadan, Ibadan, Nigeria.
2. Special facilities or activities available for visitor viewing: Materials are on display in the Programmed Learning Laboratory, Department of Education, University of Ibadan.

D. PRINCIPAL PROFESSIONAL STAFF: T.A. Balogun, Lecturer in Science Education.

E. PROJECT SUPPORT:
1. Organizational agencies: Federal (Nigeria) Ministry of Education; Western (Nigeria) State Ministry of Education; British Government (Ministry of Overseas Development).
2. Funding agency: Ministry of Overseas Development.

F. PROJECT HISTORY:
1. Principal originator: The British Government.
2. Date and place of Initiation: February, 1967; Commonwealth Education Conference, Ottawa.
3. Overall project purpose: Writing and production of programmed learning materials in mathematics and science, and their use in the teaching of math and science in secondary grammar schools to upgrade curriculum and as a last resort to meet teacher shortage.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Previous programmed learning projects sponsored by UNESCO and partly by the Ford Foundation, (Ibadan, 1963) and a UNESCO sponsored workshop, (Zaria, 1964) were concerned with teaching some Nigerians the techniques of program writing (1963); the programs produced were then tried in schools (1964) for the purpose of pilot demonstrations in the use of programmed learning. The present project produced programs specifically in science and mathematics, and used these to investigate certain program variables within a second language context. The aim ultimately is to identify those variables that will lead to production of science, math and other programs that will be most suitable for use in Nigeria.

Under the Programmed Learning Research Project the following variables were investigated:

1. Program variables (knowledge of results, response mode, format) that affect efficiency in learning from self-instructional materials in science at the third-form level of the

secondary grammar school.
2. Pupil factors (in-put measures - arithmetic ability, reading speed and comprehension, knowledge of sentence structure; home environment - parent's occupation, education; siblings - number, sex and education; physical surroundings - amenities) that affect achievement in learning from self-instructional materials in science.
3. Pupils attitude to learning from self-instructional materials in science.
4. Science variable: the effect of learning science with practical activity in the lab, or with simulated practical situations in the classroom in the lower forms of the secondary grammar school.
5. Aspects of learning efficiency among sixth-form students in the Western State of Nigeria using self-instructional materials in biology. A continuing study.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Not answered.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Biology, grades 7, 8, 9; age 12-14. Math., grades 7, 8, 9; age 12-14. Biology, grade 12 to Junior College level, age 17+. Generally average to above average students.

K. MATERIALS PRODUCED:
1. Food Factors in Ecology (Junior College level).
2. Osmosis (Parts 1 & 2).
3. Parallel Lines.
4. Polygons.
5. Water Relations of Plants (Parts 1 & 2).

L. MATERIALS AVAILABLE FREE: Items 1-5, from: T.A. Balogun, Institute of Education, University of Ibadan, Ibadan, Nigeria.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: New materials are being developed particularly in areas of science as part of teacher education programme.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: About 250.
2. Number of students involved: 2,625.
3. Number of schools involved: 32.
4. Total number of teachers using any of the materials: 4.

5. Total number of students using any of the materials: As above.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? All except 1 and 4 are definitive.
7. Name and location of selected schools where the course is being taught: Project schools were located mainly in the Western and Lagos States of Nigeria.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Teachers from schools that participated in the project were brought to the Institute of Education, U.I. for a three day induction course into the rationale of program use and the purpose of the project.
2. Activities conducted for pre-service and in-service teacher training: All education students of this university are being exposed to the rationale and techniques of programmed learning. In particular, those who are going to teach science subjects and mathematics are being encouraged to write short programs. Drive-in conferences have been given to members of Science Teachers Association of Nigeria, and Mathematics Association of Nigeria.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Mainly mimeographed materials are used. No real cost analysis has been done.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by the Ministry of Overseas Development (U.K.).
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished research: In the studies with simple experiments and observations, 14 year olds who did them concretely were not better than those who had simulated practical situations (reported experiments, photographs of specimens/objects) when tested on interpretation of information from real-life specimens and pictorial illustrations. (Although we would wish all our pupils to develop manipulative skills, etc. and thus provide concrete experiences as often as possible). Some 14 year olds were observed to have some difficulty in using pictorial information. Boys were superior consistently in all mixed schools used, although not statistically significantly so.
4. Additional evaluative data available to interested individuals: A resume of not more than 40 pages of the project report is under preparation. It may be obtained later from: Ministry of Overseas Development, Eland House, Stag Place, London S.W. 1, England or Marty Roebuck, PL Research Unit, The University, Glasgow, W-2, U.K.

T. PROJECT PUBLICITY:

1. Roebuck, M., "Using Programs in a Developing Country", New Education, June 1968. And in Aspects of Educational Technology 2, Dunn & Holyrod (eds.). London, Methuen.
2. Balogun, T.A., "Educational Technology & Science Education in Nigeria", Journal of Science Teachers Association of Nigeria, Vol. 7, No. 3, December 1968.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

To do more evaluation study especially with the science materials with an aim to identifying more variables that affect teaching and learning of science in this part of the world and to evaluate teachers' and pupils' attitudes to self-instructional techniques in science education. It is hoped this will provide information for rational decision-making in implementing educational technology in Nigerian science education, bearing in mind existing conditions and facilities for teaching and learning.

A. PROJECT TITLE: S.T.A.N. CURRICULUM DEVELOPMENT PROJECT.

B. PROJECT DIRECTOR: Dr. Gareth Howell, Curriculum Coordinating Secretary,c/oThe British Council, P. O. Box 3702, Lagos.

C. PROJECT HEADQUARTERS:
1. Contact: Rev. P. S. Samuel, The General Secretary, S.T.A. N., International School, University of Ibadan, Ibadan, Nigeria.
2. Special facilities or activities available for visitor viewing: Provision may be made to attend conferences and workshops.

D. PRINCIPAL PROFESSIONAL STAFF: Most of them are teachers doing work for the Association as members, to carry on its program.

E. PROJECT SUPPORT:
1. Organizational agencies: CESAC (Ford); CREDO (U. K.); Federal Government of Nigeria.
2. Funding agencies: Not answered.

F. PROJECT HISTORY:
1. Principal originator: Science Teachers' Association of Nigeria.
2. Date and place of Initiation: 1968; Ibadan, Nigeria.
3. Overall project purpose: To develop a science curriculum for secondary schools in Nigeria and eventually for English-speaking West Africa.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: First Nigerian attempt to produce an indigenous curriculum based on the experience from other projects elsewhere, but meant for all aspects of the country. Partly included in the philosophy paper for the Integrated Science.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS:
1. Basic Science (Integrated Science) - Forms I & II.
2. Biology, Chemistry, Physics - Forms III - V. (U. K. 'O' Level).

K. MATERIALS PRODUCED:
1. Integrated Science Syllabus with philosophy and methodology published as 1st Curriculum News Letter.
2. Syllabuses for III - V, in the three subjects - Biology, Chemistry and Physics - (in print at the moment; will be ready in a months time) as Curriculum Development Newsletter 2.

L. MATERIALS AVAILABLE FREE: Items 1 and 2.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Student's Texts and Teacher's Guides.

Q. PROJECT IMPLEMENTATION: Once accepted by the Examining Body, whole of the Federation of Nigeria.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Pre-service and in-service training arranged by Ministries, British Council and S.T.A.N.
2. Activities conducted for pre-service and in-service teacher training: Pre- and in-service courses and vacation courses are financed by schools or individual teachers or by the Ministries of Education.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Nothing at the moment.

S. PROJECT EVALUATION: Not yet carried out.

T. PROJECT PUBLICITY: None.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:

1. Held a conference in August to prepare writers.
2. Held a seminar to finalize the syllabus for I & II mentioned in L.

V. PLANS FOR THE FUTURE:

1. April 1970 - for 6 weeks - on Biology, Physics and Chemistry for year III Teacher and Pupil materials. A Writers' Workshop.
2. Writers Workshop to develop pupil and teacher material in integrated science - to be held in September 1970 at College of Education, University of Lagos, for 5 weeks.

A. PROJECT TITLE: DEPARTMENT OF EDUCATION, TERRITORY OF PAPUA AND NEW GUINEA SCIENCE COURSE.

B. PROJECT DIRECTOR: M.N. Maddock, Inspector of Schools (on leave).

C. PROJECT HEADQUARTERS:
1. Contact: Director of Education, Education Department Headquarters, Konedobu, Papua, New Guinea.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: D.A. Mitchell, R. Hynes, R. Stanton, G. Griffiths, M. Mortimer, K. Marshall, P. Plummer, A. Williams, B.A. Jeans.

E. PROJECT SUPPORT:
1. Organizational agencies: UNDP/UNESCO assisting with Staff for Goroka Teachers College; Education Department of Papua, New Guinea, providing majority of staff and organization.
2. Funding agencies: UNICEF providing equipment to supplement supplies provided by Education Department of Papua New Guinea.

F. PROJECT HISTORY:
1. Principal originator: M.N. Maddock.
2. Date and place of Initiation: 1965; Papua - New Guinea.
3. Overall project purpose: To develop a sequence of courses from primary through high school suitable to the Papua- New Guinea situation.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: To develop a science course appropriate to the Papua- New Guinea situation in which pupils come from a culture emerging from the stone age, lacking cultural concepts compatible with modern science. The teaching has to be done in English, which is a foreign language to the students, Papua-New Guinea having 700 different local languages. The basis of teaching is practical work to provide basic experiences lacking in the local culture. The course consists of basic core aimed at developing a set of basic concepts, a development area consisting of a detailed technological study, an environmental study of at least one aspect of direct impact in the student's local situation, and a research project.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups, Library research, Field studies.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science; grades 7-10.

K. MATERIALS PRODUCED:
1. Syllabus, Forms I - II.
2. Syllabus, Forms III - IV.

L. MATERIALS AVAILABLE FREE: None; supplies are exhausted.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Basic Text Forms I - II.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 123.
2. Number of students involved: 13,500.
3. Number of schools involved: All schools in system - more than 60.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: Kila Kila High School, Port Moresby; Goroka High School, Goroka; Kwikila High School, Central District; Cameron High School, Milne Bay; De LaSalle High School, Bomana; Chanel College, New Britain.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Not answered.
2. Activities conducted for pre-service and in-service teacher training: Pre-service training - Goroka Teachers College. In-service seminar workshops.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Some evaluation is in progress, both internal and by outside agency.
2. Pertinent published research studies:
L.D. Mackay, "An Analysis of Performance of Territory and Victorian Students on the 1967 School Certificate Examination", Papua - New Guinea Journal of Education, Vol. 6, No. 1, Feb. 1969.
3. Brief abstract of in-house or unpublished research: Research grant has been granted to L. Mackay and P. Gardner of Monash University (Victoria, Australia) for evaluation studies. Mackay is following up study related to old syllabus (see above) and Gardner is working on word studies.

Item analyses of examination results have been collected but not yet interpreted.

4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY:

1. Griffiths, K.G., "The Framework of Scientific Enquiry -- A Factor in Constructing Scientific Curricula", Papua and New Guinea Journal of Education, Vol. 6, Feb. 1969.

2. Maddock, M.N., "The Beginning of a New Era of Secondary Science Education", Papua and New Guinea Journal of Education, Vol. 5, No. 4, 1968.

3. Maddock, M.N., "Science Education in Papua New Guinea", Bulletin of UNESCO Regional Office of Education in Asia, Vol. IV, No. 1, Sept. 1969.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Primary school project (grades 1-6) now underway in pilot schools under guidance of UNESCO Science Adviser, Mr. A.B. Williams. Senior High School Course (grades 11-12) under development. Modifications have been made to the first two years course (grades 7 and 8). The new syllabus has been tested at grade 9 and grade 10 by new type of examinations.

V. PLANS FOR THE FUTURE: Primary school project will be extended. Forms I-IV syllabuses will be continually under review. Senior high school syllabus will continue to be developed. Because of very limited staff (most of committee are teachers in the field who work on development in addition to normal duties) progress is relatively slow compared to a fully staffed curriculum project.

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A. PROJECT TITLE: PHYSICS EQUIPMENT PROJECT.

B. PROJECT DIRECTOR: Dr. Liceria B. Soriano, Acting Director, Bureau of Public Schools, Manila, Philippines. Telephone: 221170.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: The prototypes of physics equipment at the Physics Equipment Center, University of the Philippines.

D. PRINCIPAL PROFESSIONAL STAFF: Segundo Roxas, Professor (in charge of curriculum development); Luis Alarilla, Professor (in charge of teacher training); Lamberto Jeresano, Supervisor of Equipment Production; Asterio Palima, Instructor (in charge of physics equipment design).

E. PROJECT SUPPORT:
1. Organizational agencies: Department of Education, University of the Philippines; Bureau of Public Schools; Bureau of Vocational Education.
2. Funding agency: National Science Development Board, Colombo Plan (Britain and New Zealand).

F. PROJECT HISTORY:
1. Principal originators: Dr. Liceria B. Soriano, Mr. Romulo Mendoza, Dr. Dolores Hernandez, Mr. Reginald Melton, Mr. Mauro Gonzales, Mr. Aurelio Juele, Dr. Luz Sangalang, Mrs. Angela M. Villavert, Mrs. Aurora Santos.
2. Date and place of Initiation: August 1, 1966; Manila.
3. Overall project purpose: To improve the teaching of high school physics throughout the country.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: To provide and improve coordination in teacher training, equipment production, curriculum development and laboratory improvement through an integrated program of:
1. Local production of inexpensive and educationally valid equipment.
2. Development of technical blue prints and explanatory notes on physics equipment.
3. Training of teachers and supervisors on the use and minimum repair of physics equipment.

To lower the price of physics equipment in schools through a pilot demonstration project.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Physics; fourth year high schools; 16-17 years old.

K. MATERIALS PRODUCED:

1. Ticker tape timer.
2. Multi-purpose stand kit.
   Stand with clamps, rods, ring.
   Meter stick.
   Screen.
   Incline plane.
3. Spiral spring kit.
4. Cart kit.
5. Boyle's law kit.
6. Linear Expansion kit.
7. Calorimeter kit.
8. Magnetic lines of force kit.
   Wood base and cardboard.
   Iron filings.
9. Reflection-refraction kit.
   Plane mirror with stand.
   Semi-circular lens.
   Pins.
10. Wave generator kit.
11. Centripetal-centrifugal force kit.
12. Projectile kit.
13. Momentum kit.
14. Puck kit.
15. Ripple tank with accessories.
16. Wave kit.
17. Buoyant force and density kit (Irregular samples).
18. Electrostatic kit.
    Electroscope.
    Flannel cloth.
19. Light bulb kit.
20. Electrolysis kit.
21. Ionization kit.
22. Galvanoscope.
23. Force due to magnetic field kit.
24. Electromagnet
25. Optical lenses kit.
26. Resistance wire kit.
27. Motor kit.
28. Oersted experiment kit.
29. Switch.
30. Battery holder.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 6.
2. Number of students involved: About 300.
3. Number of schools involved: 6.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: Pasay City High School, Pasay City; Mapa High School, Manila; San Francisco High School, Quezon City; R. Rodriguez School of Arts & Trades, Manila; Rizal National Agricultural School, Tanay, Rizal; Marikina School of Arts and Trades, Marikina, Rizal.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Two supervisors from the Bureau of Public Schools and the Bureau of Vocational Education and two zone supervisors visit classes using the materials to help teachers in the proper use of the equipment.
2. Activities conducted for pre-service and in-service teacher training: Monthly meetings with teachers using the materials are held to discuss the problems encountered by the teachers in the use of the equipment. The meetings are held under the leadership of the zone supervisors.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: "Fundamentals of Physics" prepared by the U.P. Science Education Center.

S. PROJECT EVALUATION: No evaluation has been made yet.

T. PROJECT PUBLICITY: None.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: April 22, 1969 - June 2, 1969:

1. Summer training for 5 science supervisors, 6 physics teachers and 2 technical representatives from 2 zones.
2. Production of physics equipment by a trade school for the Manila zone.

July 1, 1969 - June 30, 1970:

1. Production of physics equipment for Cebu and Zamboanga zones.
2. Academic training for 9 physics teachers from the Cebu and Zamboanga zones.

V. PLANS FOR THE FUTURE: The project will phase out.

A. PROJECT TITLE: SCIENCE EDUCATION CENTER, UNIVERSITY OF THE PHILIPPINES (SEC).

B. PROJECT DIRECTOR: Dolores F. Hernandez, Science Education Center, University of the Philippines, Diliman, Quezon City, Philippines.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Curriculum materials; tryout classes during the school year; equipment, especially for physics and chemistry.

D. PRINCIPAL PROFESSIONAL STAFF: Consuelo V. Asis, Chairman, Biology Work Group; Josefina C. Fonacier, Chairman, Mathematics Work Group; Porfirio Jesuitas, Chairman, General and Elementary Science Work Group; Segundo V. Roxas, Chairman, Physics Work Group; Pilar da Silva, Chairman, Chemistry Work Group; Aurora Minoza, Chairman, Evaluation Committee; Leticia Cortes, Asst. Chairman, High School Science I; Julieta Savellano, Asst. Chairman, High School Science II; Merritt Kimball, Ford Foundation Consultant.

E. PROJECT SUPPORT:
1. Organizational agencies: University of the Philippines; Department of Education; National Science Development Board.
2. Funding agencies: The Ford Foundation; UNICEF; University of the Philippines; National Science Development Board.

F. PROJECT HISTORY:
1. Principal originators: Dr. Augusto Tenmatay, Dr. Enrique T. Virata, Dr. Dolores F. Hernandez.
2. Date and place of Initiation: November 1, 1964; University of the Philippines. In June 21, 1969 the Center was established as a permanent unit (rather than a special project) by an act of Congress.
3. Overall project purpose: In its final phase, the major function of the Center was curriculum development. The second phase was started with the improvement of science teacher education as its main objective.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: The work of the Center is envisioned in three phases: curriculum development for elementary and secondary school mathematics and science (student texts, teacher's guides and laboratory manuals); teacher education; and research in mathematics and science education. The curriculum materials are designed to emphasize imaginative inquiry and to promote skills for independent learning rather than dogmatic assertion and memorization of facts. The project differs from other local activities with similar purposes in that it has a staff devoting full time to this work, and in that a tryout program with intensive evaluation is included.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, Programmed instruction, Laboratory investigations, Lectures, Seminars.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS:

Subject and Grade	Age level	Ability Level
Elem. science (grades 1-6)	7-12	Elementary school
Elem. math (grades 1-6)	7-12	Elementary school
High school science I	13	High school
High school science II	14	High school
Chemistry	14-15	High school
Physics	16	High school
High school math I	13	High school
High school math II	14	High school
High school math III	15	High school
High school geometry	15	High school

K. MATERIALS PRODUCED: Only experimental editions of the following have been produced so far. The first five have been tried out for two years. Tryout is still going on for the others.

1. Elementary School Science 1, 2, 3; teacher's guides only.
2. Chemistry for Philippine High Schools.
3. Fundamentals of Physics.
4. High School Mathematics I.
5. High School Mathematics II.
6. High School Science I.
7. Elementary School Science 4, 5; teacher's and pupil's guides.
8. Elementary School Mathematics 1, 2; teacher's and pupil's workbooks.
9. Elementary School Mathematics 3, 4; pupil's guides.
10. High School Mathematics III.
11. High School Geometry.

The following are commercially available:

12. The Gene. It is in programmed form and is intended for biology teachers.
13. Biology for Philippine High Schools; textbook, lab manual and teacher's guide.

L. MATERIALS AVAILABLE FREE: None except for brochures and newsletters.

M. MATERIALS PURCHASABLE:
Item 13: Textbook, hardbound - P16.90; textbook, newsprint - P8.00; lab manual - P6.00; teacher's guide - P6.00, from: Alemar's, 769 Rizal Ave., Manila, The Philippines.

Item 12: P4.35, from: Vibal's, E. de los Santos Ave., Quezon City, The Philippines.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: The workbooks for elementary school mathematics grades 1 and 2 will be translated into Pilipino.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. High School Science II; teacher's guides and student texts.
2. Elementary School Science 6; teacher's and pupil's guides.
3. Elementary School Mathematics 5 and 6; teacher's and pupil's guides.
4. Revised editions of the materials that have been tried out, to be published commercially.
5. Teacher's guides to accompany pupil's materials that have been produced.
6. Resource materials for biology teachers:
    (a) Common Plants of the Philippines.
    (b) Common Animals of the Philippines.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: High school 26, Elementary 36.
2. Number of students involved: High school 2,225; Elementary 1,372.
3. Number of schools involved: High school 15, Elementary 8.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: Araullo High School, Manila; Mariano Ponce High School, Bulacan; Marikina School of Arts and Trades, Rizal; Phil. Women's University High School, Manila; Rizal High School, Rizal; San Francisco High School, Quezon City; San Miguel High School, Bulacan; St. Scholastica's College, Manila; U.P. High School, Quezon City; Darangan Elementary School, Rizal; P. Gomez Elementary School, Manila; U.P. Elementary School, Quezon City.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Monthly meetings of experimental teachers with SEC senior staff.
2. Activities conducted for pre-service and in-service teacher training: Summer institutes to orient prospective experimental teachers to the materials they will try out. These are financed by the National Science Development Board. Approximate costs: P350 per participant per summer.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Teacher's guides; pre-tests and post-tests; some teaching devices especially for elementary teachers.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research:

(a) "Class Inclusion Concept Development in Children: Effect of Two Curriculum Programs" Unpublished Ph. D. Dissertation of Mrs. Emily Miao submitted to the College of Education, U.P., April 1969.

Annotation: With the use of Kofsky's quasi-ordinal scale constructed after the classificatory logic sequence postulated by Piaget, the study hypothesized, among others, that relevant curricular programs have significant effect on the attainment of the class inclusion concept. Using 168 subjects divided equally between samples of SEC "experimental" and "control" classes, school year 1967-68, Grades I and III, the investigator found conclusive evidence at .01 significance level that those pupils using the SEC curricular materials scored higher in the Kofsky test than their control counterparts who were using traditional materials. One of the conclusions arrived at is that children under a curricular program, the objective of which is to develop an effective thinking process, tend to perform significantly better as a group on a test for the attainment of class inclusion concept.

(b) "Teacher Dimensions in Pupils' Science Achievement" Unpublished Ph.D. Dissertation of Mrs. Lourdes C. Reyes submitted to the College of Education, U.P., 1969.

Annotation: The study sought to determine which among twenty-five dimensions previously hypothesized as associated with general teaching effectiveness will be relevant to pupil gains in science achievement. Using the SEC on matched experimental and control classes, the investigator made four tests of her hypothesis (1) on elementary experimental science classes, (2) on elementary control classes, (3) on high school experimental classes, and (4) on high school control classes.

The study identified three teacher dimensions positively differentiating "more" and "less" effective science teachers-namely original thinking, conformity and aesthetic interest. Also identified were three negatively differentiating variables -- sociability, personal adjustment and leadership. The latter findings indicated that contrary to the common notion that effective teachers are sociable, well-adjusted and high on leadership, the "effective" science teacher tends to be low on these dimensions. The implication of this finding for the UP Science Education Center is that the teacher factor does operate in the success of pupils with or without the SEC curricular materials, thus suggesting institution of teacher factor control in future SEC experimental research designs.

4. Additional evaluative data available to interested individuals: Individuals interested in going through evaluative data may contact the Chairman of the Evaluation Work Group, Science Education Center.

T. PROJECT PUBLICITY: Not answered.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Evaluation program for the high school science 1; elementary school science 4, 5; elementary school mathematics 1-4, "Patterns and Processes" of the BSCS, and the ISCS materials was started. A graduate program in physics and chemistry education leading to the degree of Master of Arts and Teaching started in 1969 with financial support from UNICEF, Ford Foundation and the National Science Development Board.

V. PLANS FOR THE FUTURE:
Expect to start experimental program in high school science 2, elementary school science 6, elementary school mathematics 5, 6 in schoolyear 1970. A graduate program in mathematics education and high school science education leading to the degree of Master of Arts in Teaching, also supported by NSDB, UNICEF and Ford, will start in schoolyear 1970. The following will be undertaken; adaptation of BSCS special materials for slow learners: "Patterns and Processes";Adaptation of ISCS materials, a cooperative project of Science Education Center and Bureau of Public Schools.

A. PROJECT TITLE: THE SCANDINAVIAN PHYSICS PROJECT FOR THE MODERNIZING OF THE HIGH SCHOOL PHYSICS.

B. PROJECT DIRECTOR: K. G. Friskopp, Lansskolnamnden, Box 941, 701 31 Orebro 1, Sweden. 019/12 44 40.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director, The Scandinavian Physics Project for the Modernizing of the High School Physics.
2. Special facilities or activities available for visitor viewing: During the school year visits to the schools are possible.

D. PRINCIPAL PROFESSIONAL STAFF: A number of different persons have worked on the project at various times.

E. PROJECT SUPPORT:
1. Organizational agencies: Formerly Organization for Economic Cooperation and Development, Paris.
2. Funding agencies: The Governments in Finland, Norway and Sweden.

F. PROJECT HISTORY:
1. Principal originators: Educational Services Incorporated and Organization for Economic Cooperation and Development.
2. Date and place of Initiation: 1961; Cambridge, Great Britain.
3. Overall project purpose: To present the PSSC-ideas to Scandinavian pupils.

G. PRESENT COMMERCIAL AFFILIATIONS: Universitetsforlaget, Oslo; Biblioteksforlaget, Stockholm; Norstedts Skolmaterialforlag, Stockholm.

H. PROJECT OBJECTIVES: To renew school physics in the gymnasium (high school level) in Scandinavia on the bases of the PSSC-physics program. The first Scandinavian edition followed fairly closely the first American edition with an addition in quantum physics. The second Scandinavian edition, worked out in close cooperation with E. S. I., follows fairly closely the PSSC College Physics.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Discussion groups, Pre- and post-lab discussions.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Gymnasium physics dealing with all parts of physics; grades 10-12; age levels 16/17-18/19. The course is taught in the natural science and technical curricula of the gymnasium.

K. MATERIALS PRODUCED:

1. Fysikk I-IV, 1962-63 - Universitetsforlaget, Oslo, Norway.
2. Fysik I-V, 1962-65 - Biblioteksforlaget, Stockholm.
3. Fysik I-IV, 1966-68 - Biblioteksforlaget, Stockholm.
4. Fysikk I, 1970 - Universitetsforlaget, Oslo.
5. Laborationshandledning I, 1970 - Norstedts Skolmaterialforlag, Stockholm (Lab guide I).
6. Lararhandledning I, 1970 - Norstedts Skolmaterialforlag, Stockholm (Teachers Manual I).

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: Items 1, 3, 4, 5, 6. Item 2 is out of print.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: First edition: Norwegian and Swedish; second edition: Finnish, Norwegian and Swedish.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: About 120.
2. Number of students involved: About 4000.
3. Number of schools involved: About 30.
4. Total number of teachers using any of the materials: Not known.
5. Total number of students using any of the materials: Not known.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Ekenas Samlyceum, Ekenas, Finland; Oslo Tekniske gymnas, Oslo, Norway; Rudbeckianska skolan, Vasteras, Sweden.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Through personal contact with project director.
2. Activities conducted for pre-service and in-service teacher training: Yearly meetings with all teachers taking part in the pilot scheme. 15.000 Swedish crowns/meeting.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION: We have tried to do an evaluation but have found it impossible to do an objective one. The subjective form of evaluation that we have used is described in the report of the pilot course. This report is now published in Swedish and will appear in English this autumn.

T. PROJECT PUBLICITY: Not answered.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: The publishing of the Swedish version of the textbook is completed and the first part of the Norwegian version is also published. The first part of the Swedish version of the lab guide and the teachers manual is also published.

V. PLANS FOR THE FUTURE: The rest of the Norwegian version of the textbook will be published during 1970-71. The publishing of the Finnish version will begin during 1971. The Swedish version of lab guide and teachers manual will be completed during 1970-71 and the Norwegian version of those will begin in 1971.

A. PROJECT TITLE: CANARY ISLANDS MATHEMATICS PROJECT (C.I.M.P.).

B. PROJECT DIRECTOR: Professor Julian B. Caparros Morata, Dr. Fleming-10 (Escaleritas), Las Palmas De Gran Canaria, Canary Islands, Spain.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: One day each week people can visit the children working in the school. After the visit, explanations are available.

D. PRINCIPAL PROFESSIONAL STAFF: Prof. Julian B. Caparros Morata, Research Director; Prof. Maria de la Encarnacion Delgado de Caparros, Head Professor; Carmencita Canadas, Secretary.

E. PROJECT SUPPORT: Not answered.

F. PROJECT HISTORY:
1. Principal originators: Prof. Julian B. Capparros Morata and Prof. Maria de la Encarnacion Delgado de Caparros.
2. Date and place of Initiation: 1965; Las Palmas de Gran Canaria.
3. Overall project purpose: To experiment in order to check possibilities for improvement of our didactics.

G. PRESENT COMMERCIAL AFFILIATIONS: Not answered.

H. PROJECT OBJECTIVES: Learning against teaching; experimentation against verbalisations; structural methods against verbal ones; logic against drills; modern mathematics against traditional ones; reasoning against memorizations from concrete situations to abstractions. From the first level abstractions to true "coding - decoding"; discovery against drill.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Programmed instruction, Laboratory investigations, Lectures, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Pupils from five to fifteen years of age.

K. MATERIALS PRODUCED: The pupils work with a great variety of structured materials and several hundred work cards.

L. MATERIALS AVAILABLE FREE: First Report on the Canary Islands Mathematics Project-1967, free to individuals as long as the supply lasts. Contact Dr. Zoltan P. Dienes, 1382 rue Dominion, Sherbrooke, Province of Quebec, Canada.

M. **MATERIALS PURCHASABLE:** None. Only collections of colour slides showing the pupils in the work of class-room.

N. **LANGUAGE IN WHICH MATERIALS WERE WRITTEN:** Comments in English and Spanish languages on the above slides.

O. **LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED:** Not answered.

P. **ADDITIONAL MATERIALS BEING DEVELOPED:** Revised program.

Q. **PROJECT IMPLEMENTATION:** It has been implemented only at our pilot school. Next year the C.I.M.P. will open a new pilot school for a hundred pupils in four classes.

R. **TEACHER PREPARATION:**

1. Consultant services available for teachers using the materials: The C.I.M.P. has a permanent service of information, for all the teachers interested in the project and in the news on modern mathematics. The C.I.M.P. publish several works or papers in several reviews. For example, in Conceptos de Matematica.
2. Activities conducted for pre-service and in-service teacher training: See 1 above.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: See M, N, I, K, above.

S. **PROJECT EVALUATION:**

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: See R1 above.
3. Brief abstract of in-house or unpublished research: Recently Prof. Caparros Morata lectured on this matter. The lecture was in the line of the Drs. Biggs/Hull books on mathematics learning. This lecture is unpublished.
4. Additional evaluative data available to interested individuals: Since the work of the C.I.M.P. is in line with the Dienes' research, all the evaluative data concerning Dienes' projects are in accord with ours.

T. **PROJECT PUBLICITY:** Several descriptions published in Conceptos de Matematica. An article published in Rifforma Della Scuola. Recently Dr. Breitkopf requested from Prof. Caparros Morata several color slides for series of films in the Munich Studios.

U. **SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:** Drs. Cundy, Garret and Sabbatiello have visited our project and spent several weeks with us. We have had several exhibits of the children's work and one demonstration at the Colegio de Farmaceuticos. We have sponsored several lectures and colloquia.

V. PLANS FOR THE FUTURE:

1. Preparation of our yearly exhibition.
2. Opening of general pilot school for 100 pupils.
3. Preparation of new teaching staff for the new school.
4. Preparation of new research on secondary level of learning.

A. PROJECT TITLE: INDIVIDUALISERAD MATEMATIKUNDERVISNING (IMU) (INDIVIDUALIZED MATHEMATICS INSTRUCTION).

B. PROJECT DIRECTOR: Material part: Mr. Curt Oreberg, Lejens vag 4, 360 U2 Braas, Sweden. Evaluation part: Mr. Lars Magnus Jiven, Lararhogskolan, 200 U5 Malmo 23, Sweden.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Visits to schools are possible. Contact the National Board of Education.

D. PRINCIPAL PROFESSIONAL STAFF: Not answered.

E. PROJECT SUPPORT:
1. Organizational agency: Malmo School of Education.
2. Funding agency: The National Board of Education.

F. PROJECT HISTORY:
1. Principal originator: The National Board of Education.
2. Date and place of Initiation: 1963; Stockholm.
3. Overall project purpose: To develop materials for and investigate the effects of a system for individualized mathematics teaching.

G. PRESENT COMMERCIAL AFFILIATIONS: Hermods, S-205 10 Malmo, Sweden.

H. PROJECT OBJECTIVES: The aims of this project concerning classes 7, 8 and 9 of the comprehensive school are as follows:
1. To draw up and test self-instructional teaching material in mathematics.
2. To test suitable teaching methods for the use of this material.
3. To discover in what way the students should be grouped and the teachers used in order to obtain the maximum effect from the material and the method.
4. With the aid of the constructed material, to measure the effects of entirely individualized instruction.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics, grades 7-9, 14-16 years old.

K. MATERIALS PRODUCED:
1. Version 3, Modules 1-9, Components A, B, C.
2. Some Facts About IMU - brochure from Hermods.
3. Special topic bulletin - Didakometry - The IMU Project - School of Education, Malmo, Sweden.

L. MATERIALS AVAILABLE FREE:
Item 2 - from publisher.
Item 3 - from director.

M. MATERIALS PURCHASABLE:
All components from Hermods, S-205 10 Malmo, Sweden.
(Also English version from summer 1970)

N. LNAGUAGE IN WHICH MATERIALS WERE WRITTEN: Swedish.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Norwegian, English (Summer 1970)

P. ADDITIONAL MATERIALS BEING DEVELOPED: Special version for low achievers; 35 tapes; overhead pictures.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 1100 - 1200.
2. Number of students involved: 35,000.
3. Number of schools involved: Not answered.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Not answered.
5. Name and location of selected schools where the course is being taught: Not answered.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Handbooks for the teachers; guides for every module; personal consultant services; courses.
2. Activities conducted or pre-service and in-service teacher training: Not answered.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION: Evaluation will be finished in 1971 by Malmo School of Education.

T. PROJECT PUBLICITY: Not answered.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE: IMU will be produced and marketed by Hermod's in 1970.

A. PROJECT TITLE: IMPROVEMENT OF TEACHER TRAINING CUM EDUCATION EXTENSION PROJECT CO-ORDINATOR.

B. PROJECT CO-ORDINATOR: Dr. Aree Sunhachawee, College of Education, Mahasarakam, Thailand.

C. PROJECT HEADQUARTERS:
1. Contact: Project director, with correspondence referenced science and math marked for attention of Mr. M.L. Yaxley.
2. Special facilities or activities available for visitor viewing: Guests of the College are usually accommodated at a guest house on the campus. There is usually no difficulty in seeing college classes and primary school classes in action.

D. PRINCIPAL PROFESSIONAL STAFF: Murray L. Yaxley - UNESCO Expert (Science and Math.); Roger E.A. Bordage - UNESCO Expert (Audio-Visual Aids.)

E. PROJECT SUPPORT:
1. Organizational agencies: Ministry of Education - Teacher Education Department.
2. Funding agencies: UNESCO - UNICEF.

F. PROJECT HISTORY:
1. Principal originators: UNESCO Regional Office and Teacher Education Department.
2. Date and place of Initiation: 1969; Mahasarakam, Thailand.
3. Overall project purpose: To upgrade elementary education in Thailand.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:
1. To improve supervisory methods in student's practice-teaching.
2. Instructors of teacher training colleges will give needed consultation to teachers in primary and secondary schools.
3. Teacher training colleges are to establish educational centres which aim to provide education services to local school teachers especially in the preparation for teaching and equipment for supplementary demonstration.
4. Teacher training colleges will conduct in-service training courses to strengthen and promote new knowledge and teaching methods for local school teachers.
5. Teacher training colleges are to survey and evaluate educational achievement and instruction in local primary and secondary schools periodically.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, Seminars, School visits.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science, mathematics; grades 1-7.

K. MATERIALS PRODUCED:
Our printing press has not yet arrived. Several short lab guides on topics such as Air Pressure and Earth Science have been mimeographed. Other short papers on elementary school mathematics have been mimeographed in Thai.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Thai.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Some units in integrated science.

Q. PROJECT IMPLEMENTATION: Not applicable.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Two Unesco experts available at the Teachers' College. They visit associated schools weekly.
2. Activities conducted for pre-service and in-service teacher training: In-service seminars funded by UNICEF. Transport costs and per diem allowances are paid.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION: Not answered.

T. PROJECT PUBLICITY:
"The Mahasarakam Extension Programme", UNICEF News, March 1970.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously listed.

V. PLANS FOR THE FUTURE:
Three other Teachers' Colleges (Korat, Ubol, and Sakon Nakhorn) will join the project in 1970-1 Academic Year.

A. PROJECT TITLE: A WEST INDIAN SCIENCE CURRICULUM INNOVATION PROJECT.

B. PROJECT DIRECTOR:
1. Dr. Bryan Powell, Science Curriculum Consultant, Institute of Education, University of the West Indies, St. Augustine, Trinidad. 662/5511. (on leave of absence from Trinity College, Dublin University, Ireland)
2. Mr. Harrod Thompson, Ministry of Education Officer, Institute of Education.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. James Maraj, Resident Representative, Institute of Education, University of the West Indies, St. Augustine, Trinidad.
2. Special facilities or activities available for visitor viewing: Teaching materials developed for the project, videotapes, slides.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. Bryan Powell, Science Curriculum Consultant; Mr. Harrod Thompson, Ministry of Education Officer. (Trinidad & Tobago).

E. PROJECT SUPPORT:
1. Organizational agencies: Institute of Education, University of the West Indies; Ministry of Education, Government of Trinidad and Tobago.
2. Funding agencies: See above.

F. PROJECT HISTORY:
1. Principal originators: Dr. Iolo Williams, University College of Swansea, University of Wales. Mr. Harrod Thompson, Ministry of Education, Trinidad and Tobago.
2. Date and place of Initiation: September, 1968; Institute of Education, University of the West Indies.
3. Overall project purpose: Development of a course in general science for pupils in the junior forms of secondary schools, i.e. in the age range 11 to 14 years.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:
1. Preparation of teachers' guides and other visual aids for the course.
2. Piloting innovations in science teaching.
3. Training of non-graduate teachers involved in the project.
4. Ecological approach to biology teaching.
5. Pupil involvement at all stages of the course.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups, Video-recording.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: General science for non-selective entry into junior secondary schools. Age range 11 to 14+

K. MATERIALS PRODUCED:
1. Teachers' guides for years I and II.
2. Equipment schedules for laboratories at various levels in the secondary school programme.
3. Reference booklets for pupil's use.

L. MATERIALS AVAILABLE FREE: Brochure on description and development of project.

M. MATERIALS PURCHASABLE: None as yet. When refined and re-edited the materials will be available through commercial sources.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
1. Film strips on fauna and flora of Trinidad & Tobago.
2. Teachers' guides for year III.
3. Teaching materials for ecology.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 37.
2. Number of students involved: 2,500.
3. Number of schools involved: 23.
4. Total number of teachers using any of the materials: 50.
5. Total number of students using any of the materials: 3,500.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive: 1-4 definitive. 5 estimated.
7. Name and location of selected schools where the course is being taught: Arima Government Secondary, Arima, Trinidad; Couva Government Secondary, Couva, Trinidad; Cowen Hamilton Secondary, Moruga, Trinidad; Diego Martin Secondary, Diego Martin, Trinidad; Hillview College, Tunapuna, Trinidad; Holy Name Convent, 2 Queen's Park East, Port-of-Spain, Trinidad; Naparima Girls' High School, San Fernando, Trinidad; Rio Claro Secondary, Rio Claro, Trinidad; Presentation College, Chaguanas, Trinidad; Roxborough Secondary, Tobago; North Eastern College, Sangre Grande, Trinidad; St. Augustine Girls' High School, St. Augustine, Trinidad; San Juan Secondary School, Febeau Village, San Juan, Trinidad; Trinity College, Maraval, Trinidad; Woodbrook Secondary School, Woodbrook, Port-of-Spain, Trinidad; St. Joseph's Convent, St. Joseph, Trinidad.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Professional Staff of Institute of Education. Science Centre at University of West Indies (Still in its incipient stages).
2. Activities conducted for pre-service and in-service teacher training: a. Conferences held about once per term (3 terms in a school year) to discuss the progress of WISCIP. b. In-service courses in ecology. c. Vacation courses in chemistry and physics.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: The Teachers' Guides referred to in K may perform part of the above function. However, they are not yet available commercially.

S. PROJECT EVALUATION: Some evaluation is being done through feedback being received.

T. PROJECT PUBLICITY: None published yet.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:
1. Preparations of revised editions of teachers' guides and other WISCIP materials.
2. Introduction of WISCIP materials to other West Indian islands.

A. PROJECT TITLE: FEN OGRETIMINI GELISTIRME PROJESI.

B. PROJECT DIRECTOR: Bay Zekai Baloglu, Milli Egitim Bakanligi, Talim ve Terbiye Dairesi Baskani, Ankara, Turkey. Telephone: 183440.

C. PROJECT HEADQUARTERS:
1. Contact: Bay Sakir Soykal, Fen Ogretimini Gelistirme, Bilimsel Komisyonu Genel Sekreteri Fen Lisesi - Ankara, Turkey.
2. Special facilities or activities available for visitor viewing: Equipment Centre; pilot schools; general secretariat publications.

D. PRINCIPAL PROFESSIONAL STAFF: Members of Commission.

E. PROJECT SUPPORT:
1. Organizational agency: Ministry of Education.
2. Funding agencies: Ford Foundation, Turkish Ministry of Education, Turkish Scientific and Technical Research Council.

F. PROJECT HISTORY:
1. Principal originators: Turkish Ministry of Education and Ford Foundation.
2. Date and place of Initiation: April 1962; Turkey.
3. Overall project purpose: To improve science education in Turkish high schools and initiate an improvement in science education in Turkey.

G. PRESENT COMMERCIAL AFFILIATIONS: Not answered.

H. PROJECT OBJECTIVES: To adapt modern curriculum materials for use in Turkish high schools and to educate the teachers in the use of these materials. Ten senior high schools and ten teacher training colleges are now selected as pilot institutions.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics, physics, chemistry and biology; fourth to sixth grade of high schools (16 to 18 years old).

K. MATERIALS PRODUCED:
1. Turkish Adaptation of PSSC Physics.
2. Turkish Adaptation of PSSC Advanced Topics.
3. Turkish Adaptation of CHEM Study.
4. Turkish Adaptation of BSCS Biology, blue version.
5. Turkish Adaptation of SMSG Geometry.
6. Basic Mathematics (Three Volumes-By Turkish authors).

7. Geometry III (By a Turkish author).

L. MATERIALS AVAILABLE FREE: All of the items in K are available through project.

M. MATERIALS PURCHASABLE: All items can be purchased through the Ministry of Education Publishing Office - Sultanahmet, Istanbul, Turkey.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Turkish.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: In order to adapt the laboratory equipment of the projects in item K to our conditions, necessary modifications are being made.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 95.
2. Number of students involved: 2,734.
3. Number of schools involved: 21 (9 pilot lycees and 12 teachers' colleges).
4. Total number of teachers using any of the materials: (95 in pilot lycees, 80 in teachers' colleges) = 175.
5. Total number of students using any of the materials: 2,734.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Definitive.
7. Name and location of selected schools where the course is being taught: Contact project director for this information.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: There is a standing committee with which teachers can consult about their problems. Beside the members of the standing committee, experienced teachers of the Science Lycee visit pilot schools from time to time.
2. Activities conducted for pre-service and in-service teacher training: Summer schools are being held in Ankara for both pre-service and in-service teacher training. There are also short courses held in pilot Lycees on testing and evaluation. The cost of the summer courses was about one million TL, financed by project.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Beside the summer courses in item 2, a course has been held for science educators. The cost of this course was fifty thousand TL, financed by the project.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated: No.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: None.
4. Additional evaluative data available to interested individuals: Research is being carried out for the evaluation of this project. It is expected that it will be possible to obtain enough data to reach conclusions by the end of July 1970.

T. PROJECT PUBLICITY: BSCS Newsletter, May 1967.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Last year there were only two pilot lycees which had students who graduated and took University Entrance Examinations. They were much more successful compared with the other graduates. This year we will have graduates from seven more pilot lycees. There are groups which have been working on the improvement of teacher's guides, text books and laboratory equipment.

V. PLANS FOR THE FUTURE: It is expected that the number of pilot lycees will be increased by the coming school year. Within this project researches for the development of the curricula of math and science have started. A number of foreign math and science text books are being translated into Turkish.

A. PROJECT TITLE: PILOT PROJECT ON NEW APPROACHES AND TECHNIQUES OF BIOLOGY TEACHING IN AFRICA.

B. PROJECT DIRECTORS: Dr. A. Grebecki, Mrs. Anne Hunwald, Science Teaching Division, SCT, UNESCO, 7 Place de Fontenoy, Paris 7, France.

C. PROJECT HEADQUARTERS:
1. Contact: Project directors.
2. Special facilities or activities available for visitor viewing: All the material produced within the project, including printed material, loops and slides are available for inspection at the Science Teaching Division.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. A. Grebecki, Programme specialist (biology); Mrs. Anne Hunwald, Programme specialist (biology).

E. PROJECT SUPPORT:
1. Organizational agency: UNESCO.
2. Funding agency: UNESCO.

F. PROJECT HISTORY:
1. Principal originator: UNESCO.
2. Date and place of Initiation: 1966; Division of Science Teaching, UNESCO, Paris.
3. Overall project purpose: To help train African leaders in planning and producing biology teaching materials for secondary schools, adapted to local social and economic needs. To produce resource material for improved biology teaching.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Help African countries engage in science curriculum research and material production and evaluation. Assist in setting up permanent groups of biologists (university and secondary school staff, responsible officials of Ministries of Education, research biologists) to deal in a continuous way with these matters, as a starting point towards building up a comprehensive organisation dealing with all aspects of science and mathematics teaching improvement. Provide resource material for teaching, produced by Africans, in Africa. Disseminate the material produced in other parts of the world, to serve as resource material (regarding approach and subject matter covered) for producing similar material adapted to the specific needs of the country or region considered. Affiliated groups already exist in Asia and in Latin America. These objectives are stated in the various reports which are currently published in connection with the project. The "Pilot Project" was conceived to be of a limited duration and will be terminated by the end of 1970.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, Seminars (Working groups), Discussion groups, Producing material on the basis of group planning, experiments and field work carried out during "working group" meeting of limited duration. Evaluation through class-room trials and in-service workshops.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS:
1. "Investigating Living Things" (junior secondary school level, first 2-3 years), age group 11-13.
2. "Tropical Ecology", "Plant and Soil", "Some Aspects of Human Biology" (upper secondary school level) "Conservation of Biological Resources" (upper secondary level), age group 14-17.

K. MATERIALS PRODUCED:
1. "Investigating Living Things" (Introductory biology for secondary schools).

Booklet for Students:
1. The Living World Around Us.
2. Plants as the Food Producers.
3. Animals as Food Consumers.
4. Food as a Source of Energy and Material for Growth.
5. Nutrition in Man.
6. Patterns of Reproduction and Development.
7. Populations.
8. Micro-organisms.
9. Man and Diseases.
10. Living Things and Their Environment.
11. Man and His Environment.
12. Man and His Natural Resources.

Teacher's Guide:
1. Handbook for Microbiology.

15 Film Loops (8 mm):
1. Life on the Seashore.
2. Life on the Rocky Shore.
3. The Red Mangrove.
4. The Life of the Citrus Swallowtail Butterfly.
5. Termites.
6. Feeding Adaptations of Animals.
7. Collecting Insects.
8. Pinning Butterflies.
9. Preservation of Food 1: Canning.
10. Preservation of Food 2: Drying and Smoking.
11. Food Hygiene.
12. River Blindness.
13. Cattle Anthrax.
14. If Your Friend Gets Tuberculosis.
15. Kwashiorkor.

L. MATERIALS AVAILABLE FREE: All items under K are experimental and available free only to groups willing to study and evaluate them with a view of adaptation to local need or of using them as resource material for production of new teaching material. Supply limited. Material only provided, in principle, to specialized organizations such as biology teaching curriculum research panels, associations of science teachers, experimental projects in biology, etc.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Material listed under K written in English and produced also in French. Other subjects listed under J produced in French and will be translated into English as well.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: See above.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Listed under J. In addition, a series of teachers' guides for teaching ecology in the various important ecological areas of Africa is in preparation. For 1971-1972, the preparation of textbooks is foreseen on "Human Biology Relevant to Population Growth" together with a teacher training programme in this field.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Still in the trial stage, not expected to be adopted without local adaptation anywhere.
2. Number of students involved: Trials now conducted in Africa will involve several thousand students (exact figures not yet known).
3. Number of schools involved: As an average 5 schools per African country, but numbers widely vary from country to country.
4. Total number of teachers using any of the materials: Only for trial purposes. Exact numbers not yet known.
5. Total number of students using any of the materials: Not known, but only students in officially recognized trial classes use them.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: There are schools in almost every African Member State of UNESCO recognized and supervised as "trial" schools.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: National study groups are set up in every participating African country, and members of these groups organize in-service workshops for teachers and supervise the trials in the designated classes. Occasionally, upon request of the Member State concerned consultant services are made available

by UNESCO.

2. Activities conducted for pre-service and in-service teacher training: Trial programmes in class-rooms are usually preceded by in-service workshops (about 20 teachers participate as an average), which are financed from national sources with small contributions ($200-500) from UNESCO.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: The materials produced within the Pilot Project are used for this purpose and are provided free of charge by UNESCO.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by outside agency.

2. Pertinent published research studies: None.

3. Brief abstract of in-house or unpublished research: None.

4. Additional evaluative data available to interested individuals: Upon completion of the present evaluation programme, a report will be published (probably in 1971) and distributed free of charge by UNESCO.

T. PROJECT PUBLICITY: Since this is an experimental programme, not intended for general utilization, no other publicity exists than reports describing progress in the project. No publicity in journals or magazines.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: In August 1968, the material produced (as listed under K) was completed. Printing in English was completed in August 1969. Printing in French will be completed in January 1970. The Working Group on "Tropical Ecology" was held in June-July 1969 and final editing is in process. Preparations are completed for the Working Group on "Plant and Soil" to start in February 1970.

V. PLANS FOR THE FUTURE: Listed under J. Working Groups on: "Plant and Soil" (Madagascar, February-March 1970); "Some aspects of Human Biology" (June-July 1970, Morocco); "Conservation of Biological Resources" (Cameroon, November 1970-January 1971). A Conference for introducing UNESCO experts to materials produced in science teaching improvement is planned for the end of 1970. A concluding seminar on the biology teaching pilot project is planned for 1971.

A. PROJECT TITLE: UNESCO PROJECT ON THE TEACHING OF PHYSICS IN LATIN-AMERICA.

B. PROJECT DIRECTOR: Dr. Par Bergvall. (Dr. Bergvall died in 1965, and since then the Project is being coordinated directly from the Division of Science Teaching of UNESCO.)

C. PROJECT HEADQUARTERS:
1. Contact: Dr. N. Joel, UNESCO Pilot Project on the Teaching of Physics in Latin-America, Division of Science Teaching, Department of Advancement of Science, UNESCO, Place Fontenoy, Paris 7, France. Tel. 566-5757.
2. Special facilities or activities available for visitor viewing: The materials produced by the Project (see Section K) are available to visitors for viewing and for working with them; and the staff of the Division of Science Teaching is available for discussions.

D. PRINCIPAL PROFESSIONAL STAFF: Albert V. Baez, former Director of the Division of Science Teaching of UNESCO, 1961-1967; Par Bergvall, Director of the Project; Nahum Joel, Assistant-Director of the Project; Francis Mechner, Specialist in Programmed Learning and Behavioral Technology; Le Xuan, Specialist in Programmed Learning; Herman Engel, Specialist in Film and TV; Peter Robinson, Specialist in Film and TV; and 26 physics teachers from eight Latin-American countries.

E. PROJECT SUPPORT:
1. Organizational agencies: UNESCO and IBECC (Instituto Brasileiro de Educacao, Ciencia e Cultura, Sao Paulo).
2. Funding agencies: UNESCO and IBECC. Fellowships were financed by CLAF (Centro Latino-Americano de Fisica, Rio de Janeiro) and by other sources.

F. PROJECT HISTORY:
1. Principal originator: Dr. Albert V. Baez (UNESCO).
2. Date and place of Initiation: July 1963; IBECC, Sao Paulo, Brazil.
3. Overall project purpose: To encourage science curriculum improvement in Latin-America.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: To give a group of Latin-American physics teachers an opportunity to become trained in physics curriculum improvement through active participation in a specific project. The subject chosen for this work was the 'Physics of Light' as part of a secondary school physics course. The course produced places emphasis on the laboratory work done by the students and on the integration of this with their theoretical work; for this purpose the work with the lab kits is intimately combined with the texts (programmed learning manuals) developed by the Project. In fact, the texts cannot be utilized without the kits. The media of film and TV were also explored.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Discussion groups, Laboratory investigations. The lab experiments are an indispensable part of the work with the programmed learning manuals.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: The "Physics of Light" as part of a physics course at the secondary school level.

K. MATERIALS PRODUCED:

1. A programmed-learning text (both a Spanish and a Portuguese version) in five units: (0) Experiments and graphs, (1) Some fundamental properties of light, (2) A particle model for light, (3) A wave model for light, (4) Electromagnetic waves - Photons.
2. A set of eight laboratory kits with which the students do their experiments as they work through the programmed text.
3. Eleven short silent films (average time, 4 to 5 minutes each). A booklet containing teachers' guides (in Spanish) for these films has also been produced.
4. A 16 mm film (sound, 30 minutes) on the subject "Light, .. is it a wave?"
5. Scripts for eight TV programs as a complement to this course.
6. A detailed report (with illustrations) on the Project is available, in Spanish, in English, and in French.

L. MATERIALS AVAILABLE FREE: Item 6, the report "UNESCO Pilot Project on the Teaching of Physics" is available in Spanish, English, or French from Division of Science Teaching, Department of Advancement of Science, UNESCO, Place Fontenoy, Paris 7, France.

M. MATERIALS PURCHASABLE: Item 1, the texts (second edition, revised) can be purchased from ENOSA, Maria de Molina 12, Apartado de Correo 19042, Madrid 12, Spain. Item 2, the lab kits can be purchased either from ENOSA; or from IBECC, Caixa Postal 2921, Sao Paulo, Brazil.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish and Portuguese.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: English and French versions are being prepared.

P. ADDITIONAL MATERIALS BEING DEVELOPED: See O above.

Q. PROJECT IMPLEMENTATION: The course-materials developed by the Project were produced in Sao Paulo on a pilot scale in 1964.

After one year of work at the Project, the Latin-American physics teachers who took part in it returned to their respective countries. Since then, they have been testing the materials with students and also making them known to other teachers. With the feedback thus obtained, some of the participants have contributed to a revised version of the texts in Spanish printed by ENOSA (Madrid). UNESCO is making available small numbers of the texts and kits to teachers interested in holding further trials and reporting their results. Some of the Project participants are available as consultants to assist in such work. Furthermore, a series of Regional (Latin-American) Seminars on New Approaches and New Materials for the Teaching of Physics is being sponsored by UNESCO in cooperation with the educational authorities of the respective host countries. Seven have taken place already (Sao Paulo, Caracas, Montevideo, Bariloche, Tegucigalpa, Santiago, and Cochabamba.) At these seminars, of four weeks duration each, some of the Project participants present the result of their work; and other recent physics teaching projects are presented by some of their main authors (Nuffield and Harvard at the May 1968 Seminar in Santiago). Most of the time at these seminars is spent in laboratory work and subsequent discussions. In this way, these seminars hope to encourage physics curriculum improvement as well as the local adaptation and development of new course materials.

R. TEACHER PREPARATION: Answered as part of Q.

S. PROJECT EVALUATION: No formal evaluation yet. Only feedback from some of the Project participants (they can make their reports available to interested individuals).

T. PROJECT PUBLICITY: Not answered.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE: Production of an English and a French version of the texts; further testing of the Project materials, including also other regions of the world. A seminar of the type mentioned above (paragraph Q) will be held in Bangkok in April 1970 thus beginning the extension of this work to Asia.

A. PROJECT TITLE: UNESCO SCIENCE TEACHING PROJECT IN ASIA.

B. PROJECT DIRECTOR: Professor J.A. Campbell, UNESCO Project for Science Teaching in Asia, P.O. Box 1425, Bangkok, Thailand.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Prof. J.A. Campbell, Acting Project Director; Dr. Sunt Techakumpuch, Project Co-director, Chulalongkorn University, Bangkok; Dr. H. Herm, Unesco Associate Expert, Project Associate Director; Dr. A.F. Kapauan, Chemistry Consultant; Dr. L.O. Rudstrom, Unesco Physics Expert; Mr. M.A. Rawoof, Project Manager.

E. PROJECT SUPPORT:
1. Organizational agencies: Government of Thailand; UNESCO.
2. Funding agencies: Government of Thailand; UNESCO.

F. PROJECT HISTORY:
1. Principal originator: UNESCO.
2. Date and place of Initiation: September 1965; Bangkok.
3. Overall project purpose: To encourage science curriculum improvements in Asia.

G. PRESENT COMMERICAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: UNESCO's programme: To assist science educators in Asia in their task of carrying out reform of chemistry teaching along these lines, UNESCO has organized the Pilot Project for Chemistry Teaching in Asia. The project is operating along two major lines which are distinct but coordinates: (a) Modernization of chemical content and development of new teaching materials is the primary task of the Pilot Project Centre for Research and Development in Chemistry Teaching located in laboratories at Chulalongkorn University, Bangkok, Thailand. (b) Assistance to in-service and preservice teacher training, studies and information on improvement of examinations, better textbooks, and use of the latest methods of teaching - all school-oriented applications of the basic research of the Bangkok Centre - are tasks UNESCO is expecting the study groups to accept. At least one study group has been organized in each of the 15 Asian countries participating in this pilot project.

2. The Centre for Research and Development in Chemistry Teaching. This project is based upon research and development work in chemistry teaching of an International Working Group of chemistry teachers, scientists, and other consultants, drawn from universities and teacher-training colleges through-

out Asia, and centered in a special laboratory and workshop at Chulalongkorn University in Bangkok, Thailand. Science educators come to the International Working Group (I.W.G.) under fellowships supplied by UNESCO, by governments and by foundations, for periods from three months to a year, and occasionally for shorter periods, to take part in basic research work into the actual chemistry content which is found in most school courses. These participants also take part in writing programmed instructional sequences, developing suitable chemical systems for student instruction, and making 8 mm short film loops. UNESCO is drawing to this centre recognized leaders of curriculum reform projects from different parts of the world, for example, from the Nuffield Chemistry Project in the U.K., the CHEM Study and C.B.A. projects in the U.S.A., and the Approach to Chemistry group in Australia, in order to share their experiences in a first-hand way with the Asian science educators participating in the I.W.G.

3. Formation of study groups for science teaching improvement: UNESCO has invited science educators in each Asian country to organize a Study Group for Science Teaching Improvement, which can affiliate with the Pilot Project as a means of receiving support and help in its work. UNESCO is assisting these study groups in several ways: by supplying experimental teaching materials (resource materials) prepared by the I.W.G. in Bangkok to stimulate local preparation of textbooks and other teaching materials; and by arranging for representatives from outstanding curriculum reform projects to visit study groups as consultants for in-service courses for teachers, or as consultants on curriculum reform and the preparation of teaching materials. Furthermore, members of the study groups have an opportunity to acquire valuable experience by becoming personally involved in basic work as participants of the IWG in Bangkok for a period of time.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Most of our participants so far have been high school chemistry teachers and supervisors.

K. MATERIALS PRODUCED:
1. Programmed Instruction Sequence, 1966.
2. Teachers' Guide to the above programmed sequence, 1966.
3. 8 mm Film Loops in Cassettes.
4. Film Loop Production Notes, 1967.
5. Teachers' Guide to Film Loops, 1967.
6. Compound Formation (Vols, I and II), Teachers' Digest, 1967, 1968.
7. Chemical Equilibria, A Teachers' Digest, 1968.
8. Experiments on Chemical Equilibria, 1968.

9. Experiments on Compound Formation, 1969.
10. Compound Formation (Vols. I and II) (Thai translation), 1969.
11. Experiments on Chemical Equilibria (Thai translation), 1969.
12. Newsletter, a bi-monthly periodical.
13. Prototypes of low cost kits: "Teaching Experiments on Chemical Equilibria", "Teaching Experiments on Compound Formation" and "Teaching Experiments on Rate of Chemical Reactions."
14. Experiments on Rate of Chemical Reactions, 1969.
15. Experiments on Nuclear Science, 1969.
16. Experiments on Compound Formation (Thai translation), 1969.

L. MATERIALS AVAILABLE FREE: All items in K from headquarters.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English and Thai.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Student material on Rates of Chemical Reaction.

Q. PROJECT IMPLEMENTATION: None of our materials qualify as a 'course'. They may however be used as supplementary materials; by how many teachers is not known.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Consultation with staff, use of library and laboratory facilities.
2. Activities conducted for pre-service and in-service teacher training: Workshops on selected topics; summer 1970 is on Rates of Reaction. Costs borne by Unesco and Thai grant. Budget is around $5,000 for 36 local participants and 5 regional (non-Thai) participants.
3. Available pre-service and/or in-serivce teaching materials for science educators to use in preparing teachers: Described in previous communication. This year's activities will result in a) student chapter b) lab guide and c) teacher's guide on Rates of Reaction.

S. PROJECT EVALUATION: No evaluation has been performed.

T. PROJECT PUBLICITY: Not answered.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE: Not answered.

A. PROJECT TITLE: MODERNIZATION OF SECONDARY SCHOOL MATHEMATICS IN SLOVENIA (MGM).

B. PROJECT DIRECTOR: Stanko Ursic, Counsellor for Mathematics and Physics, Zavod za solstvo SRS, Ljubljana, Yugoslavia. Dusan Modic, Drustvo matematikov, fizikov in astronomov SRS, Ljubljana, pp 227, Yugoslavia.

C. PROJECT HEADQUARTERS:
1. Contact: Dusan Modic, Kostialova 36, Novo mesto, Yugoslavia.
2. Special facilities or activities available for visitor viewing: Interviews with the authors of text-books and with the project director.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. France Krizanic, Professor; Dr. Niko Prijatelj, Prof.; Ivan Pucelj; Ivan Stalec; Stanko Ursic; Dr. Alojzij Vadnal, Prof.

E. PROJECT SUPPORT:
1. Organizational agencies: Zavod za solstvo SRS, Ljubljana, Yugoslavia; Drustvo matematikov, fizikov in astronomov SRS.
2. Funding agencies: Zavod za solstvo SRS, Ljubljana, Yugoslavia; Drustvo matematikov, fizikov in astronomov SRS.

F. PROJECT HISTORY:
1. Principal originators: Dr. France Krizanic, Dr. Niko Prijatelj.
2. Date and place of Initiation: 1961; Ljubljana, Yugoslavia.
3. Overall project purpose: Content and form innovation in secondary school math.

G. PRESENT COMMERCIAL AFFILIATIONS:
1. Drzavna zalozba Slovenije (DZS), Ljubljana, Yugoslavia.
2. Mladinska knjiga (MK), Ljubljana, Yugoslavia.
3. Drustvo matematikov, fizikov in astronomov SRS (DMFA), Ljubljana 227 Obzorja, Maribor, Yugoslavia.

H. PROJECT OBJECTIVES: "Clear Thought and Smooth Calculation" (Dr. F. Krizanic: Aritmetika, algebra in analiza I, DZS, Ljubljana, 1968). See also T.1.1 and T.1.2.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Lectures, Seminars, Discussion groups, Background Reading (SIGMA).

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: 15-19 year olds; general ability level.

K. MATERIALS PRODUCED:

1. France Krizanic, Aritmetika, algebra in analiza I, DZS, Ljubljana,1963 and 1968.
2. France Krizanic, Aritmetika, algebra in analiza II, DZS, Ljubljana, 1964 and 1967.
3. France Krizanic, Aritmetika, algebra in analiza III, DZS, Ljubljana, 1965 and 1969.
4. France Krizanic, Geometrija III, DZS, Ljubljana, 1969.
5. Ivan Pucelj-Ivan Stalec: Geometrija I, Obzorja, Maribor, 1966.
6. Ivan Pucelj, Elementarna geometrija kot model evklidicnega vektorskega prostora, DMFA, Ljubljana, 1967.
7. Podrobni ucni nacrt - Curriculum Content for I and II, DMFA, Ljubljana, 1967.
8. Ivan Stalec, Zbirka nalog iz arithmetike, algebre in analize I, DMFA, Ljubljana, 1968.
9. Ivan Stalec, Zbirka nalog iz aritmetike, algebre in analize II, DMFA, Ljubljana, 1968.
10. Avsec, Cokan, Potisek, Pucelj, Roblek, Stalec, Vagaja; Zbirka nalog iz aritmetike, algebre in analize III, DMFA, Ljubljana, 1969.
11. Ivan Vidav, Grupe v geometriji, DMFA, Ljubljana, 1970.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE:

Items 1-3: DZS Ljubljana; price 13.00 Din each book.
Item 4: DZS Ljubljana; price 3.00 Din.
Item 5: Obzorja, Maribor; price 11.00 Din.
Items 8-10: DMFA, Ljubljana 227; price 10.00 Din each book.

N. LNAGUAGE IN WHICH MATERIALS WERE WRITTEN: Slovene.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. France Krizanic, Aritmetika, algebra in analiza IV.
2. Ivan Pucelj, Geometrija II.
3. Minimal curriculum content for non-specialist general education.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 100.
2. Number of students involved: 8,000.
3. Number of schools involved: 35 grammar schools.
4. Total number of teachers using any of the materials: 130.
5. Total number of students using any of the materials: 10,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.

7. Name and location of selected schools where the course is being taught: All the grammar schools in Slovenia. The program is incomplete for the present.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Zavod za solstvo SRS, Ljubljana.

2. Activities conducted for pre-service and in-service teacher training:

(a) One year methods course in the fourth year of the undergraduate study: elementary mathematics (3 periods per week); methods of teaching math (2 periods per week).

(b) Periodic seminars for (3-5 days) teachers in-service.

(c) Study groups: 3 per year (1 day)
8 per year (half a day)

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers:

(a) See Items K6, 7, and 11.

(b) Obzornik za matematiko, fiziko - (Review), DMFA, Ljubljana, pp. 227, price 2 S.

(c) Sigma: I. Vidav, Reseni in nereseni problemi matematike, 1959.
A. Vadnal: Elementarni uvod v verjetnostni racun, 1959.
N. Prijatelj: Uvod v matematicno logiko, 1960.
F. Krizanic, Elektronski aritmeticni racunalnik, 1969.
I. Vidav, Algebra, 1961.
O. Sajovic, Normalna aksonometrija, 1962.
F. Krizanic, Vektorji, matrike, tenzorji, 1962.
Z. Bohte, Numericno resevanje enacb, 1964.
N. Prijatelj, Matematicne strukture, I, 1964.
R. Jamnik, Elementi teorije informacij,1964.
I. Vidav, Stevila in matematicne teorije, 1965.
A. Vadnal, Funkcije I, 1968.
R. Jamnik, Teorija iger, 1966.
J. Grasselli: Osnove teorije stevil, 1966.
N. Prijatelj, Matematicne strukture II, 1967.

Mladinska knjiga, Ljubljana. The price for each book is 25.00 Din.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff and by Zavod za solstvo SRS, Ljubljana.

2. Pertinent published research studies: Stanko Ursic, Matematika v 1. razr. gimnazije (Obzornik za matematiko in fiziko, 10, 181 (1963), DMFA.

T. PROJECT PUBLICITY:

1. Predlog ucnega nacrta za matematiko in fiziko (A Proposal for Mathematics Syllabus in Grammar Schools) - Obzornik za matematiko in fiziko 8, 133, (1961).

2. Gimnazija - gradivo za sestavo predmetnika in ucnega nacrta (Grammar School - Materials for Curriculum and Syllabusses for Grammar Schools) - Zavod za napredek solstva SRS, DZS, Ljubljana, 1964 (Pages 70 to 74).

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:
Partial inclusion of non-grammar type secondary schools in the project.

SYNOPSES

1. WEST AFRICAN A-LEVEL BIOLOGY.

CONTACT: Prof. D.W. Ewer, Department of Zoology, University of Ghana, Legon, Accra, Ghana.

This project is in the process of preparing materials for students and teachers for use in West African countries in conjunction with a new ecologically-oriented A-Level syllabus. The illustrative material is almost exclusively African. The first volume of the text will be printed in 1970.

2. AUSTRALIAN SCIENCE EDUCATION PROJECT (ASEP).

CONTACT: Mr. H.O. Howard, P.O. Box 210, Hawthorn, Victoria, Australia 3122. Tel. 811271 (until May 1970). After May 1970, address correspondence to The Director.

This project has just begun development of instructional materials in science for use by teachers and pupils in grades 7-10 in Australian schools. The staff will also arrange for the materials to be tried out in a representative group of Australian instructional settings. They will produce evaluative and descriptive instruments to be used with the materials. Once developed, they will construct a model of a teacher education program to insure implementation and will establish a specialist resource service for interested individuals.

3. CANBERRA MATHEMATICAL ASSOCIATION PAMPHLETS FOR TEACHERS.

CONTACT: Dr. M.F. Newman, Canberra Mathematical Association, Department of Pure Mathematics, Australian National University, Box 4, Canberra, A.C.T., Australia.

The Association is sponsoring the authorship of a group of pamphlets aimed at: correcting mistakes in the New South Wales syllabuses and the textbooks written around them; suggesting approaches to topics different from those in the textbooks; and providing more detailed notes to syllabus topics where such material is not readily available elsewhere. Among topics which have been covered are: algebra, probability, and integrals.

4. EDMONTON JUNIOR HIGH SCHOOL PROCESS-APPROACH PROJECT.

CONTACT: Dr. Marshall A. Nay, Associate Professor, Department of Secondary Education, University of Alberta, Edmonton 7, Alberta, Canada. Tel. (403) 432-4371.

This project attempts to develop an approach to teaching which will give students an understanding of and skill in "the process of science". It is an amalgam of Science-A Process Approach, Schwab's theory of the structure of disciplines, the staff's perception of the nature of scientific inquiry and the realities and traditions of science teaching. The project has developed a three-year sequence of junior high school science courses, based on behavioral objectives in both the product and process dimensions. The approach model is complete, and work has begun on the materials and tests and procedures for evaluating progress.

5. EDMONTON JUNIOR HIGH SCHOOL SCIENCE RESOURCE BANK PROJECT.
CONTACT: Dr. Marshall A. Nay, Associate Professor,
Department of Secondary Education, University of Alberta,
Edmonton 7, Alberta, Canada.

This project was established to develop a resource bank for the teaching of physical science in junior high school. The bank will consist of several sub-banks covering: concepts, instruction strategies, specific lessons, audio-visual materials, problems, test-items, etc. The bank will be field tested to determine its utility in developing and teaching science courses. Eventually, it will be computerized.

6. THEMATIC ELEMENTARY SCIENCE INDIVIDUALIZED STUDIES (THESIS).
CONTACT: Mr. Harry Zuurbier, St. Cecilia's School,
610 Agate Cr., S.E., Calgary, Alberta, Canada.

This experimental project is designed to provide elementary science students with an individual discovery-learning curriculum within a four theme framework. The themes are: energy, life, matter, and universe. The students make selections within the four themes according to their interest, ability and motivation. They then obtain the equipment, perform the experiments, and record their findings. Contact director for materials. Data are being collected in an effort to support the idea that elementary students can learn sciences in an individualized program.

7. LONG-TERM POST-GRADUATE COURSE IN "MODERN METHODS IN BIOLOGY".
CONTACT: Acad. Ivan Malek, Institute of Microbiology, Czech.
Academy of Science, Budejovicka 1083, Prague 4. Tel. 491841.

In an effort to teach modern biological and biochemical methods, a one year basic course for students from developing countries has been planned. The course is divided into two months of theoretical and ten months of practical work. The practical work is individualized and the best students are then recommended for training toward the Ph.D.

8. ELECTRONICS TEACHING PROJECT FOR TEACHERS AT ELEMENTARY LEVEL (ETP).
CONTACT: Dr. Povl Vedelsby, Royal Danish School of Experimental Studies, Department of Physics, Emdrupveg 115B,
DK-2400 Copenhagen NV, Denmark.

In an attempt to create a pre-service course in electronics for elementary teachers, with the emphasis on structure and function, this group has developed materials which students can study by means of block diagrams and other procedures which will emphasize the understanding of integrated circuits and the changes taking place in the structure and function of electronic entities. Materials thus far developed include a simple radio receiver, a complete radio assembly kit, a dictionary of electronics terms, a resonance dipmeter, work sheets and a teacher's guide. All materials are written in Danish. Future plans include materials for a course in logic circuitry.

9. PREPARATION OF A COURSE ON ELEMENTARY PARTICLE PHYSICS (TEPP).
CONTACT: M. Nikolic or M. Paty, Laboratoire de Physique Corpusculaire, Centre de Recherches Nucleaires, Rue du Loess, 64-Strasbourg-Cronenbourg, France.

This textbook development project is being conducted as a collective work constructed by several teams of authors from different countries. The work is to be collected into a unified format. The emphasis is to be on elementary particle physics as an empirical science. The book is intended for post-graduate students wishing to specialize in experimental high-energy physics. A preliminary draft of the contents for each chapter was submitted February 1, 1970, and the work of the writing teams will begin shortly.

10. CURRICULUM STUDIES.
CONTACT: Dr. Saul B. Robinsohn and Dr. Doris Knab, Institut for Bildungsforschung in der Max-Planck-Gesellschaft, 1 Berlin 31, Blissestrasse 2, West Germany. 87-01-21.

These studies aim at perfecting the current practice of curriculum reform by developing and testing instruments for permanent revision of the curriculum. On the basis of systematic identification and definition of situations, qualifications, and curriculum elements, alternatives are developed to prepare decisions on educational goals and curriculum practices. With curriculum construction in mind, the aim of the present study is systematic inference of criteria and the formulation of hypotheses about these three classes of curriculum variables and their inter-relations. These criteria include a wide range of value judgments and other factors of cultural heritage, present and future needs, ascertained data on the influence of learning and instruction on behavior, etc. Hypothetical connections between such variables are considered as basic prerequisites of curriculum construction.

11. FRANKFURTER PROJEKT.
CONTACT: Dr. Heinrich Bauersfeld, Director of the Seminar for the Teaching of Mathematics, 6000 Frankfurt am Main, Senckenberganlage 11, Federal Republic of West Germany.

The purpose of this project is the modernization of the teaching of mathematics for grades K-4. Along with the development of new materials, the project also does research on cognitive processes and other aspects of mathematics learning. Materials have been produced for first and second grade classes. Contact the director for sources and prices.

12. INTRODUCTION OF EXPERIMENTS INTO CLASSES.

CONTACT: Karl Eckel, Deutsches Institut Fuer Internationale Paedagogische Forschung, Sclostrasse 29, 6 Frankfurt/M90, West Germany. 0611/771047.

This project has produced a programmed text in three volumes called "Introduction to Electricity". It deals with the theory of electricity for high school students 15-16 years old. Teacher's guides and materials for experiments are being developed. The publisher is Vieweg & Sohn, 33 Braunschweig, West Germany.

13. EDUCATIONAL USES OF LIVING ORGANISMS (E.U.L.O.).

CONTACT: Mr. P.J. Kelly, Centre for Science Education, Chelsea College, Bridges Place, London S.W. 6, England. 01-736-3401.

This project is to carry out an investigation of the problems associated with the educational use of living organisms in schools. An attempt will be made to determine the needs of schools with respect to living organisms and the associated educational, administrative and biological problems. They will also identify and evaluate the usefulness of different species of living organisms for teaching purposes. When the most appropriate species have been identified, suitable culture and maintenance techniques will be devised and appropriate teaching procedures and materials for their effective use will be planned.

14. AN EVALUATION OF NEW METHODS OF TEACHING SCIENCE.

CONTACT: J.F. Eggleston, Leicester University School of Education, 21 University Road, Leicester, England.

This project will use instruments to measure cognitive gains and affective changes to compare pupils taught by different teachers using different methods in terms of their cognitive attainments and their attitudes. The instruments will be administered to measure the initial state of the pupils. The staff will gather evidence on the kinds of learning experiences predominantly used in schools and will classify teachers according to their preferred methods and finally the instruments will be re-administered to compare attainment of pupils taught by teachers in each category.

15. REDUCED SCIENCE COURSES FOR PREPARATION FOR HONOURS COURSES IN SCIENCE.

CONTACT: Prof. L.R.B. Elton, Institute for Educational Technology, University of Surrey, Guildford, Surrey, Great Britain. Tel. Guildford 71281, Ext. 402.

A study is being made of the introductory science courses offered at Surrey in an effort to determine the type of student attracted to the course, the minimal schoolwork needed in preparation for the course, methods for bringing students of diverse backgrounds to a common basic standard, and the applicability of these courses to other universities.

16. SCIENCE TEACHER EDUCATION PROJECT.

CONTACT: Dr. C.R. Sutton, Leicester University School of Education, 21 University Road, Leicester, England.

This is a three-year research and development project held jointly with the University of Reading on the initial training of science teachers. The project will provide trial and evaluation services for small units of work for student teachers devised by any tutors or supervising teachers in schools who wish to contribute. The aim is to build up a bank of such units with accompanying materials such as video tapes, sound tapes, films and reproductions of pupils' work. Thus, there will be available a range of materials from which individual tutors can choose when building courses to fit their particular circumstances. Some will be relevant to the preparation of all science teachers while others will apply to the individual disciplines.

17. SIXTH FORM TECHNOLOGY PROGRAMME.

CONTACT: Prof. L.R.B. Elton, Institute for Educational Technology, University of Surrey, Guildford, Surrey, Great Britain. Tel. Guildford 71281, Ext. 402.

This project is designed to help sixth form science students to understand applications of the principles they learn. The project investigates how principles learned in the sixth form are applied in industry and builds working models to show their findings. The models will form a permanent exhibition which will be used to give lectures to students and science teachers. Some models which have been developed are: optical dipstick, programmed teaching machine and electro-manometer. The project also hopes to produce films showing science applied in industry.

18. ALTERNATIVE SYLLABUSES IN PHYSICS, CHEMISTRY AND BIOLOGY FOR SECONDARY SCHOOLS IN SCOTLAND.

CONTACT: Mr. W.R. Ritchie, H.M.I., Scottish Education Department, St. Andrew's House, Edinburgh, Scotland.

Syllabuses of the Scottish Certificate of Education Examination Board are available from J. Menzies Limited, Stationer, Princes Street, Edinburgh. The syllabuses produced are:

Physics, O and H grades,	1969
Chemistry, O and H grades,	1969
Biology, O and H grades, ,	1968

These syllabuses were started in 1962 and have now been revised in 1969. Textbooks written on these syllabuses are:

Jardine, Physics is Fun
Johnstone and Morrison, Chemistry Takes Shape
Clarke, et. al., Biology by Enquiry

They have been published by Heinemann.

19. HONG KONG BSCS ADAPTATION PROJECT.

CONTACT: Mr. Jimmy Chan, 133 Caine Road, Flat D, Hong Kong.

This project, which has just been organized, is seeking the support of the Asia Foundation to translate BSCS materials for the last three years of secondary school into Chinese for use in Hong Kong. The first drafts of the adapted materials are expected to be ready in the summer of 1970.

20. PRIMARY SCHOOL SCIENCE PROJECT.

CONTACT: V.N. Wanchoo, Adl. Director Education, Delhi Administration, Old Secretariat, Delhi, India. Tel. 226126.

This project was developed to prepare materials for primary school science emphasizing both the processes of science and the local environment. It is designed for children between 6 and 11 years of age of all ability levels; special materials are envisaged for the gifted group. Materials are being prepared in the area of general science. They are being written in Hindi and will be translated into English.

21. SCIENCE TEACHERS' WORKSHOP (STW).

CONTACT: Mr. C.S. Rao, Associate Director, Science Workshops, America Peace Corps, 10-1-19/3 Masab Tank, Hyderabad 4, India.

Under the direction of Mr. B.P. Reddy, this project plans to train science teachers in the improvisation of apparatus, in the undertaking of science investigations and in the practice of inquiry teaching. The project is aimed at teachers of all the sciences. They have produced a Science Teachers Handbook, lesson plans and prototypes of improvised apparatus. The Science Teachers Handbook is available from American Peace Corps, 21 Alfred Street, Richmond Town, Bangalore 25, India. Future plans call for integration of the Workshop into the teacher-training syllabus.

22. BASIC BIOLOGY EDUCATION STUDY.

CONTACT: Prof. Yosito Sinoto, General Culture Course, International Christian University, Opawa Mitaka-shi, Tokyo, Japan 181.

The purpose of this project is the improvement of teaching and evaluation of biology in the high school and university. They also carry out research on curriculum development of biology teachers. They have adapted the BSCS newsletters on photosynthesis, breathing, and the molecular biology of ATP and have produced a study on the teaching of biochemistry.

23. DEVELOPMENT OF COMPUTER-ASSISTED INSTRUCTION IN SCIENCE EDUCATION.
CONTACT: Prof. Shigehiro Kobayashi, Faculty of Education,
Kagawa University, Takamatsu-shi, Kagawa-ken, Japan.

This project has produced materials for computer-assisted instruction for the 7th, 8th and 9th grades. Average students use group-paced equipment, while the gifted and the slow learners work under individualized pacing. Research on software and hardware has resulted in four reports on computer-assisted instruction.

24. DEVELOPMENT OF TEACHING EQUIPMENT FOR SCIENCE EDUCATION.
CONTACT: Prof. Ryokichi Okazaki, Faculty of Education, Nara
University of Education, Takahata-machi, Nara-ken, Japan 630.

This project is aimed at the production, selection, and improvement of teaching equipment for science education from first grade through the junior college. Equipment for thirteen new physics experiments has been produced.

25. ELEMENTARY SCIENCE IMPROVEMENT COMMITTEE.
CONTACT: Mr. Hisao Morikawa, Science Department, Tokyo
Institute for Education, 1-1-14, Meguro, Meguro-ku, Tokyo,
Japan.

This project was formed to improve elementary science education from first to ninth grade. The three main objectives are: to construct a modernized science curriculum suitable for Japanese schools; to develop meaningful science materials; and to develop science teaching methods. Progress reports are available from Mr. Morikawa.

26. IMPROVEMENT OF ELEMENTARY AND JUNIOR HIGH SCHOOL SCIENCE CURRICULA.
CONTACT: Prof. Toshiaki Shirai, Tokyo Science University,
Kazurazaka Shinjuku-ku, Tokyo, Japan 162.

This project is charged with improving the structure of compulsory science education at the elementary and junior high levels. An attempt to incorporate recent advances in science education and to focus on student abilities will be made. From the findings, new materials, equipment and audio-visual aids will be developed. The project has produced two research reports, a study of the content and structure of junior high texts and a report of new methods and experiments in geology.

27. MODERNIZATION OF MATHEMATICS IN ELEMENTARY AND SECONDARY SCHOOL.
CONTACT: Dr. Yasuo Akizuki, President, Gunma University,
Maebashi-shi, Gunma-ken, Japan 731.

The aim of this project is to improve mathematics education by doing research in and developing models for: the minimum components of the mathematics curriculum from elementary through high school, computer-assisted instruction and pre-service mathematics education at the teacher training colleges.

28. MODERNIZATION OF SECONDARY SCHOOL CHEMISTRY.

CONTACT: Prof. Michinori Oki, Faculty of Science, Tokyo University, Hongo Bunkyo-cho, Tokyo, Japan 113.

The project hopes to establish criteria which can be used as standards for high school chemistry teaching, to determine suitable experiments, and to produce kits of equipment for the chosen experiments. They have produced the following materials:

1. Recent Developments in Chemical Education in Japan.
2. International Chemical Education, the High School Years: Japan.

29. NEW EXPERIMENTS FOR FRESHMAN CHEMISTRY.

CONTACT: Prof. Bunichi Tamamushi, Murashi University, Toyotamue Nerima-ku, Tokyo, Japan 176.

This project hopes to improve chemistry teaching in the liberal arts curriculum of the university by detailed evaluation of experiments and demonstrations in the present curriculum. The criteria for evaluation are: developments in science education, progress in modern chemistry and research on effective teaching methods. The project has produced two reports on the use of audio-visual aids in chemistry experiments.

30. PHYSICS FOR PRE-MEDICAL STUDENTS.

CONTACT: Hisakichi Kanazawa, Professor of Physics, Keio University, Hiyoshi, Kohoku-ku, Yokohama-City, 222, Japan. Tel. 044-61-6111.

This project has produced mimeographed work-sheets to parallel the physics textbook used by the students. Demonstration experiments to help clarify the principles in the lecture have also been devised. The project aim is to promote more efficient teaching and to provide a variety of aids for students who may be experiencing difficulties.

31. SCIENCE AND MATHEMATICS INSTRUCTION IN A SCIENCE AND MATHEMATICS-ORIENTED HIGH SCHOOL.

CONTACT: Prof. Kenzo Shiomi, Faculty of Science, Toho University, Narashino-shi, Chiba-ken, Japan 275.

The purpose of this project is the development of teaching plans, experiments, laboratory facilities, equipment, and evaluation methods for physics, chemistry, biology and geology in a science and mathematics-oriented high school. The project has produced a study on the improvement of elementary and junior-high science curricula.

32. TEACHING OF PHYSICS THROUGH EXPERIMENTS.
CONTACT: Prof. Ikuo Ikeda, Faculty of Technology, Hokkaido University, Sapporo-shi, Hokkaido, Japan 060.

The aim of this project is to further the education of people in all walks of life through the study of physics. Their primary concern is to do research on suitable physics experiments, to determine the desirable proportion of experiments in the physics curriculum and to develop teaching strategies and equipment for the experiments selected. They have produced a report on the Berkeley Physics Laboratory Project (Part A) and developed experiments in modern physics.

33. TEACHING STRATEGIES FOR BASIC CONCEPTS OF GEOLOGY.
CONTACT: Prof. Kagetaka Watanabe, Faculty of Science, Tokyo University of Education, 3-Chome Otsuka, Bunkyo-ku, Tokyo, Japan 112.

This project hopes to establish the basic concepts of geology for the curriculum in grades 1 through 12 and in the junior college. They will develop a rationale for teaching these concepts, decide the portion of time to be devoted to them and devise teaching strategies for the concepts. They have produced a report on research for modernizing geology education.

34. KENYA SCIENCE TEACHERS COLLEGE (KSTC).
CONTACT: Dr. Bengt-Olov Marinder, Kenya Science Teachers College, P.O. Box 30596, Nairobi, Kenya.

This project, sponsored by the Swedish International Development Authority (SIDA), establishes a plan for training science teachers for secondary schools. The training is experimentally organized and includes workshop work, making equipment, field work, and excursions. A number of in-service courses have been given, a science kit in physics has been developed, and laboratory manuals for biology have been prepared. The development of kits in chemistry, biology, and mathematics is planned.

35. SCIENCE EDUCATION PROJECT.
CONTACT: Mr. Sung-Jae Pak, National Project Director, Science Education Project, Ministry of Education, Room 535, Capitol Building, Seoul, Korea.

The purpose of this project is to improve the quality of science and mathematics teaching in the primary and secondary schools of Korea. Its activities are: curriculum development and implementation; pre-service and in-service teacher training;

and the provision, development, maintenance and repair of science and mathematics materials and equipment. It also aims to develop and improve communications within the national science and mathematics education movement and to promote government participation in the improvement of education.

36. SEAMEC - REGIONAL CENTRE FOR EDUCATION IN SCIENCE AND MATHEMATICS.

CONTACT: Mr. Chin Pin Seng, Director-Designate, RECSAM, c/o Malayan Teachers' College, Penang, Malaysia. Tel. 21268.

This centre was organized to help participating member countries to improve the teaching of science and mathematics by training key personnel in Southeast Asia so that they may reform teaching in their home countries. In the area of curriculum, the Centre has organized an extensive number of conferences and workshops for the implementation of international curriculum projects such as BSCS Philippine Biology, UNESCO Chemistry, Scottish Integrated Science, and Nuffield O-Level courses. They have held one workshop on production of a proto-type textbook for Southeast Asia to cover tropical biology and will hold another workshop in June 1970 for the development of a physics proto-type syllabus.

37. SPECIAL PROJECT, MATHEMATICS AND SCIENCE.

CONTACT: Mohamed Ali bin Ibrahim, Chief Science Organizer, Ministry of Education, Kuala Lumpur, Malaysia.

The Special Project is designed to prepare teacher guide sheets for primary teachers in Malaysian schools. The guide sheets provide explanations of content and illustrate techniques for implementing the existing science syllabus. It is hoped that implementation will provide the children with opportunities to engage in discussion and direct experimentation. As guide sheets are prepared new topics in science and mathematics will be introduced leading to a new syllabus. The project has produced two guide sheets for the first grade: Counting and Science Topics. They are written in Malay and English.

38. GROUP THEORY WITH TWELVE-YEAR-OLDS USING THE DIENES METHOD.

CONTACT: Dr. Bart van der Krogt, Didaktisch Institut, University of Amsterdam, Prinsengracht 225-227, Amsterdam, The Netherlands.

This is a study of the way children learn mathematics. The learning theories of Dr. Zoltan Dienes will be tested with twelve-year-olds who are in the upper twenty-five percent of the ability range. The study will focus on the process of abstraction using Dienes' multiple embodiment principle. The production of a series of video-tape lessons for teacher training is also planned.

39. REKENPROJEKT S.V.O. 096.

CONTACT: Dr. W.J. Brandenburg, Groenendaal 32, Groningen,
Holland. Tel. 050-21073.

The purpose of this project is to construct a set of textbooks and manuals to be used by others as a pattern for curriculum in other subjects and grades. These materials are for the first course in vocational education for girls, and are centered around mathematics. They are produced in Dutch, and there are interim reports also available in Dutch. Meetings of teachers are being held for exchanging experiences and information concerning the work with the books and appliances. The materials are designed to cause attitude changes in teachers and pupils.

40. SCIENCE EDUCATION PROGRAMME.

CONTACT: Dr. A.L. Allen, Science Education Programme,
Dept. of Mathematics, University of Papua and New Guinea,
Box 1144, P.O. Boroko, Territory of Papua and New Guinea.

This project was organized to produce materials suitable for territory schools in order to stimulate scientific awareness. It will design and construct these materials within suitable science curricula prepared for Territory schools. Research will be done on the particular scientific, conceptual, linguistic and logical difficulties of samples of Papuan and New Guinean children.

41. REGIONAL SCIENCE TEACHING CENTERS.

CONTACT: The Chairman, National Science Development,
Box 3596, Manila, Philippines.

This project is essentially a training program, using materials already produced by the Science Education Center of the University of the Philippines. It is an integrated program of re-training elementary and secondary science and mathematics teachers. It is also designed to give more training to instructors in teacher training colleges and universities. By coordinating this program with an existing curriculum development program and an equipment production project, it is hoped that a maximum impact on science and math education will be made.

42. EXPERIMENT ON THE SYSTEMATIC TEACHING OF PROBABILITY.

CONTACT: Dr. E. Fischbein, Institute of Psychology,
Str. Frumoasa 26, Bucharest, Rumania.

This project is working on a curriculum to teach probability in the 5th to 8th grades from a psychological point of view. This is a new topic in the mathematical curriculum of Rumania. A number of research papers have appeared discussing the relation between mathematical learning and concept development in children. Contact the director for the references.

43. UNESCO MATHEMATICS PROJECT FOR THE ARAB STATES.

CONTACT: Dr. G. Soos, Division of Science Teaching, UNESCO, Place de Fontenoy, Paris 7^{e}, France. Tel. 566-57-57, Ext. 34-74.

This project is an effort to assist Arab member states of UNESCO to reconstruct the teaching of mathematics in grades 10-12 of secondary schools. The quality of science and mathematics education is to be raised through promoting curriculum reform, introducing new methods of instruction and modernizing the contents of textbooks. The programme of the project is being carried out in national study groups (Tunisia, Libya, UAR, Sudan, Saudi Arabia, Jordan, Iraq, Lebanon, Syria, Kuwait, South Yemen, Bahrain), and will consist of writing sessions, regional conferences, and regional training seminars for mathematics teachers. Classroom experimentation will start in the twelve Arab countries in September of 1971. Two descriptive documents are available from the director, (UNESCO Documents SC/WS/201 and SC/WS/227), one of which is a report of a regional seminar in which eight invited speakers made recommendations on an experimental syllabus, suggestions for writing sessions, and procedures for innovation.

44. MATHEMATIC AND SCIENCE EDUCATION ACTIVITIES OF UNESCO.

CONTACT: Division of Science Teaching, Department of Advancement of Science, UNESCO, Place de Fontenoy, Paris 7^{e}, France.

In addition to the projects in biology, chemistry, physics, mathematics and integrated science described elsewhere in this report, UNESCO has undertaken the following science education activities:

1. The series "New Trends in the Teaching of Basic Sciences" has seen publication of second editions of the mathematics, physics, chemistry and biology volumes. Volumes II of chemistry, biology, and mathematics were published as well as "Mathematics Applied to Physics". Volume II of physics and the volume on integrated science are being prepared.
2. A planning meeting was held in Paris for the program in integrated science education. The meeting recommended a programme of activities aimed at assisting Member States to promote unified science education in primary and lower secondary schools. Activities include a conference held in Rehovoth, Israel in August 1969 as well as assistance to Ghana, Israel and the Philippines.
3. A meeting was held in Sao Paulo, Brazil resulting in the publication of "Popularization of Science in South America". It will be printed by the Regional Science Office.

45. UNESCO'S PROGRAMME IN INTEGRATED SCIENCE TEACHING.

CONTACT: Mrs. Sheila M. Haggis, Division of Science Teaching, UNESCO, Place de Fontenoy, Paris 7^{e}, France.

This project has been organized to assist the UNESCO member states in the promotion of the teaching of science in a unified way in primary and secondary schools, particularly in grades 1-9. The program consists of a series of publications on integrated science teaching, technical services through UNESCO field experts, experimental projects for the development of new methods and materials, and a series of regional, sub-regional, and national workshops. The following volumes will be available by the end of 1970:

New Trends in Integrated Science Teaching, Volume I. Revised Edition of the UNESCO Sourcebook for Science Teaching.

46. RESEARCH AND TRIAL PRODUCTION OF MATERIALS AND EQUIPMENT FOR TEACHING HIGH SCHOOL PHYSICS.
CONTACT: Prof. Akira Harashima, General Culture Course, International Christian University, Osawa Mitaka-shi, Tokyo, Japan 181.

The project hopes to improve high school physics education through research, development and production of materials, and development of equipment suited to the improved curricula. They have produced monographs in the areas of dynamics, optics, and electricity and magnetism which describe teaching methods and laboratory experiments.

A. PROJECT TITLE: ACTIVITIES IN SCIENCE FOR THE EDUCABLE-MENTALLY RETARDED (AIS-EMR).

B. PROJECT DIRECTOR: David P. McLaren, Secondary Science Supervisor, Los Angeles City Unified School District, P.O. Box 3307, Los Angeles, California 90054. (213)625-8911, Ext. 2053.

C. PROJECT HEADQUARTERS:
1. Contact: Alfred Casler, Supervisor, Special Programs in Education - EMR, P.O. Box 3307, Los Angeles, California 90054. (213)625-8911, Ext. 2695.
2. Special facilities or activities available for visitor viewing: Self-contained loan kits with consumable supplies, equipment, and printed materials for students. Available for viewing at Secondary Science Center, 6645 Balboa Blvd., Van Nuys, California 91406. (213)881-4950.

D. PRINCIPAL PROFESSIONAL STAFF: David P. McLaren, Science Supervisor; Alfred Casler, Supervisor, EMR; Lawrence Loughlin, Robert Jones, and Alex Balian, Temporary Consultants; Gerald J. Garner, Science Center Specialist.

E. PROJECT SUPPORT:
1. Organizational agency: Los Angeles City Unified School District.
2. Funding agencies: Los Angeles City Unified School District and State of California. Excess Cost Entitlement.

F. PROJECT HISTORY:
1. Principal originators: Supervisor of Special Programs - EMR. Science Supervisor and Specialist.
2. Date and place of Initiation: September, 1967; Los Angeles City Unified School District.
3. Overall project purpose: To provide EMR students (individually tested I.Q. 50-75) with completely self-contained kits for use in classroom lacking science laboratory facilities and proper utilities.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: To provide EMR students with the opportunity to learn basic science concepts relevant to their lives, including health, safety, and human physical development. To provide all necessary laboratory supplies and equipment in self-contained kits. To provide student worksheets suitable for assembling into a science notebook. To provide teachers, possibly with little science background, with sufficient information to understand the investigations and provide assistance during student activities.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science for junior and senior high school classes for EMR, included in four-period core program conducted by one or more teachers. Grade 7 - 12 (2 programs, junior and senior high schools); age 11-18; individually measured I.Q. 50-75.

K. MATERIALS PRODUCED: Junior and senior high school programs have similar organization with different kits.

Teacher material:

1. Outline course of study.
2. Annotated catalog of available kits.
3. Ordering and delivery information.
4. Teacher's handbook.
   Teacher background material.
   Keys to all student activities.

Student materials:

Junior high school, 25 kits, and senior high school, 27 kits, containing one set of printed worksheets for each student, loan equipment, and consumable supplies.

L. MATERIALS AVAILABLE FREE: Program descriptions. Sample order form from Alfred Casler (see C.1.)

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 240.
2. Number of students involved: 4,320.
3. Number of schools involved: 109.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: Contact project headquarters.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Monthly meetings on Saturdays with a representative committee of teachers. 17 area workshops for all teachers.
2. Activities conducted for pre-service and in-service teacher training: See "R-1" conducted by consultant.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: Feedback from senior high school teachers resulted in revision of first edition.
4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: None.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Correlation of course of study, kits, and available texts. Additional kits as required. Revision of junior high school kits. Final publication of all materials.

A. PROJECT TITLE: ANTHROPOLOGY CURRICULUM STUDY PROJECT (ACSP).

B. PROJECT DIRECTOR: Dr. Malcolm Collier, Director, ACSP, 5632 Kimbark Avenue, Chicago, Illinois 60637. (312)493-4620.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Inspection of books and course materials.

D. PRINCIPAL PROFESSIONAL STAFF: Malcolm Collier, Director; Roberta MacGowan, Assistant Director; Research Staff: T. W. Parsons, Senior Consultant; Morton Tenenberg, Senior Associate; C. Will Ekhoff, Senior Assistant; Burma Haiblum, Junior Assistant; Margaret Schmidt, Secretary.

E. PROJECT SUPPORT:
1. Organizational agency: American Anthropological Association.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: American Anthropological Association Committee on High School Anthropology, Malcolm Collier, Chairman.
2. Date and place of Initiation: 1961; Chicago.
3. Overall project purpose: To explore the potentiality of anthropological data and ideas for high school students and to develop materials to implement the potential.

G. PRESENT COMMERCIAL AFFILIATIONS: The Macmillan Company.

H. PROJECT OBJECTIVES: Not answered.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Not answered.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Where applicable within social studies (world history, world cultures, American history, problems in democracy), and biology. Secondary school; junior high school.

K. MATERIALS PRODUCED:
1. Newsletter.
2. Two-Dozen Anthropology Books: An Annotated Bibliography.
3. Day One: Anthropological Materials in Social Studies Courses; A Case Study.
4. History as Culture Change: An Overview (A three week course on the study of "human societies - past & present" - using data in the form of filmstrips, records, casts, overhead transparencies, worksheets, readings; Teaching Plan).
5. The Great Tree and the Longhouse: The Culture of the Iroquois by Hazel W. Hertzberg (including teaching plan).

6. Kiowa Years and Kiowa Profile by Alice Marriott (including teaching plan).
7. An Annotated Bibliography of Anthropological Materials for High School Use by James J. Gallagher.

L. MATERIALS AVAILABLE FREE: 1-3. ACSP, 5632 Kimbark Avenue, Chicago, Illinois 60637.

M. MATERIALS PURCHASABLE: 4. (Teacher's Kit: 4 worksheets, 12" record, 4 casts of artifacts, 2 filmstrips, 2 overhead transparencies, Teaching Plan; Student Materials: Readings, Evidence Cards, Site Map, Sumerian Tablet Translation Sheets) Available from: The Macmillan Company, 866 Third Avenue, New York, N. Y. 10022. Teacher's Kit $49.95; Student's Materials $1.50 each.

		Macmillan List price	Macmillan School price
5.	Student book	$2.40	$1.80
	Teacher's Manual	1.20	.90
6.	Student book	2.60	1.95
	Teacher's Manual	.48	.36
7.		3.00	2.40

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Patterns in Human History - a 16-week course.

Q. PROJECT IMPLEMENTATION: Not answered.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: The Teaching Plan is a detailed guide to the course including extensive background material.
2. Activities conducted for pre-service and in-service teacher training: Not answered.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: To be developed by ACSP and distributed, probably by the Macmillan Company.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, program of evaluation and implementation now being carried out in Berkeley by ACSP Research Staff.

T. PROJECT PUBLICITY:
1. Anthropology & World History Texts by Rachel R. Sady in Phi Delta Kappan, February 1964.

2. Anthropology in the Schools by Robert G. Hanvey in Educational Leadership, Feb. 1965.
3. Anthropology in the High School by Malcolm Collier, in Scholastic Teacher, Dec. 1968.
4. Social Myth vs. Social Science by Robert G. Hanvey in Saturday Review, Nov. 18, 1967.
5. Anthropology in the Pre-Collegiate Curriculum by Malcolm Collier & Edwin S. Dethlefsen in Human Organization, Spring 1968.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Development and preparation for publication of PATTERNS IN HUMAN HISTORY; development of teacher service materials; initiation of research and implementation program.

V. PLANS FOR THE FUTURE: Conclusion of above activities.

A. PROJECT TITLE: AUDIO-VISUAL TUTORIAL LABORATORY PROGRAM IN INTRODUCTORY GEOLOGY.

B. PROJECT DIRECTOR: Prof. Walter C. Sweet, Department of Geology, The Ohio State University, 125 South Oval Drive, Columbus, Ohio 43210.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Two functioning laboratories (one with 24 stations, the other with 32). These are in operation 10 hours a day, Monday through Friday, and visitors are always welcome. Best to check with Project Director in advance.

D. PRINCIPAL PROFESSIONAL STAFF: In addition to the director of this project, Geology 100 is supervised by Professor Russell Utgard.

E. PROJECT SUPPORT:
1. Organizational agency: The Ohio State University.
2. Funding agencies: National Science Foundation (support for development of single-concept films and programmed laboratory manual).

F. PROJECT HISTORY:
1. Principal originator: W. C. Sweet.
2. Date and place of Initiation: May 1966; Ohio State University.
3. Overall project purpose: To improve quality of laboratory instruction and widen laboratory experience in introductory geology, primarily for non-science students.

G. PRESENT COMMERCIAL AFFILIATIONS: None as yet. Negotiations in progress.

H. PROJECT OBJECTIVES: Our objectives have been to develop a laboratory program for introductory geology, based on a problem-solving approach, that is accessible to students at times of their choosing and through which they can proceed at their own pace. The nature of scientific investigations is constantly emphasized, with the materials of earth science the vehicle. Traditional laboratory approaches in the earth sciences have emphasized "how to" skills; these are minimized in the current program. We are not aware of closely comparable programs in the earth sciences, although the audio-visual approach is used in a few college-level situations.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Lectures, Audio-visual (sound movies) and slides, Tutorial (one to one).

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Introductory college-level geology (combined physical and historical). Most students have little or no background in science and relatively little training in mathematics.

K. MATERIALS PRODUCED:

1. 13 single-concept movies (sound).
2. Partially programmed laboratory manual (Sweet, Bates & Maccini, 1969).
3. Diverse special materials (models, etc.).
4. 45-page description of project, program, and an evaluation of the latter; includes list of necessary materials and approximate unit costs.

L. MATERIALS AVAILABLE FREE: Report is in process of being printed; will be available by March 1, 1970, from project director.

M. MATERIALS PURCHASABLE: We are in the process of making arrangements for commercial distribution of Items 1 and 2 (and perhaps some of the special materials of Item 3). These arrangements have not been completed. Write to director for information.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: It is in use only at The Ohio State University, now - still in development.
2. Number of students involved: About 3,500 each academic year.
3. Number of schools involved: One.
4. Total number of teachers using any of the materials: All the staff of our introductory course - about 4 per term.
5. Total number of students using any of the materials: 3,500 a year.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive: Definitive.
7. Name and location of selected schools where course is being taught: The Ohio State University, Columbus, Ohio.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Write to director - we've always been happy to discuss the project with interested parties.
2. Activities conducted for pre-service and in-service teacher training: None.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated: Yes, by project staff.
2. Pertinent published research studies: (Not published) Maccini, J. A., 1969, Evaluation of an Audio-Visual Tutorial Laboratory Serving College-Level Introductory Geology. Unpubl. Ph.D. Dissertation, The Ohio State University, 208 p. (available on microfilm from University Microfilms, Ann Arbor, Mich.).
3. Brief abstract of in-house or unpublished research: Eighty percent of the students tested registered favorable to strongly favorable opinions concerning the AVT laboratory. All students achieved as a result of the program, both in the short-term and the long-term. There was a negative correlation between time spent in the laboratory and degree of both long and short-term achievement (slow learners spent longer than faster ones; both achieved, but the high-achievers achieved more). Students expressed strongly positive feelings about the various media employed and about the tutorial aspects of the teaching program.
4. Additional evaluative data available to interested individuals: Information is available in the Ph. D. Dissertation mentioned above. It can be obtained on microfilm for a nominal charge. Write to University Microfilms, Ann Arbor, Michigan. We will summarize pertinent information on program evaluation in the report (item 4, section K, above), which will be available at no charge by (or before) March 1, 1970.

T. PROJECT PUBLICITY: None has been published.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Development of materials (films, manual, special equipment) completed. Project evaluation completed and written up. Final report written and in process of being printed.

V. PLANS FOR THE FUTURE: This particular project is completed save for assignment of distribution rights to materials developed.

A. PROJECT TITLE: BIOLOGICAL SCIENCES CURRICULUM STUDY (BSCS).

B. PROJECT DIRECTOR: Dr. William V. Mayer, University of Colorado, P. O. Box 930, Boulder, Colorado 80302.
(303)443-2211, Ext. 6453.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: BSCS materials available for inspection in reception and information area. Rather complete biology library with periodicals and special materials for secondary biological education; 2 small combination labs; 3 small conference rooms; 1 large classroom/conference room; and projector and film audiovisual aids area.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. William V. Mayer, Director; Mr. Manert Kennedy, Associate Director; Mr. George M. Clark, Assistant Director; Mr. Keith Bumsted, Business Manager; Mr. Patrick Balch, Consultant; Dr. Thomas Cleaver, Consultant; Dr. James Robinson, Consultant; Mr. Harold Rupert, Consultant; Dr. Richard Tolman, Consultant; Mr. Robert Wilson, Art Director.

E. PROJECT SUPPORT:
1. Organizational agencies: AIBS, 1959-63; University of Colorado 1963 to present.
2. Funding agencies: NSF, NSF/AID, Asia Foundation, Ford Foundation, Rockefeller Foundation, USOE.

F. PROJECT HISTORY:
1. Principal originator: American Institute of Biological Sciences (AIBS).
2. Date and place of Initiation: 1959; Boulder, Colorado.
3. Overall project purpose: To contribute to the improvement of biological education through the preparation of curriculum materials related to the study of biology.

G. PRESENT COMMERCIAL AFFILIATIONS: Publishers of our materials. See K.

H. PROJECT OBJECTIVES: To contribute to the improvement of biological education through preparation of curriculum materials related to the study of biology. Three versions of BSCS biology have been produced and are now revised (2nd editions); an international program involves many scientists overseas in processes of adaptations of the three versions and other BSCS materials in various languages.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Lectures, Seminars, Discussion groups, Computer assisted instruction.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: First course in secondary school biology (10th grade) ages 15, 16; second course in secondary school biology (12th grade) Ages 17, 18; supplementary materials for all secondary school levels in biology; special materials for low-ability high school students; materials for teachers of biology.

K. MATERIALS PRODUCED:

1. Biological Science: Molecules to Man (Blue Version, Revised Edition): Houghton Mifflin Co., 110 Tremont St., Boston, Mass. 02107.
2. High School Biology: BSCS Green Version (Green Version, Revised Edition): Rand McNally & Co., P. O. Box 7600, Chicago, Ill. 60680.
3. Biological Science: An Inquiry into Life (Yellow Version, Revised Edition): Harcourt, Brace & World, Inc., 757 Third Ave., New York, N. Y. 10017.
4. Comprehensive Final Examination for use with the 1968 Revised Editions are available through the version publishers.
5. Comprehensive Final Examination for use with the 1963 editions: The Psychological Corporation, 304 E. 45th St., New York, N. Y. 10017.
6. Version Quarterly Tests for 1963 and 1968 editions are available through the version publishers.
7. Processes of Science Test: The Psychological Corporation, 304 E. 45th St., New York, N. Y. 10017.
8. Biological Science: Interaction of Experiments and Ideas (A BSCS Second Course): Prentice-Hall, Inc., Englewood Cliffs, N. J. 07632.
9. Second Course Tests-Quarterly Tests and Final Examination: Prentice-Hall, Inc., Englewood Cliffs, N. J. 07632.
10. Biological Science: Patterns and Processes (Special Materials): Holt, Rinehart and Winston, Inc., 383 Madison Ave., New York, N. Y. 10017.
11. Special Materials Tests-Unit Tests and Final Examination: The Psychological Corp., 304 E. 45th St., New York, N. Y. 10017.
12. Laboratory Blocks-Plant Growth and Development; Animal Growth and Development; Microbes: Their Growth, Nutrition, and Interaction; The Complementarity of Structure and Function; Field Ecology; Regulation in Plants by Hormones-A Study in Experimental Design; Animal Behavior; Life in the Soil; Genetic Continuity; Physiological Adaptation; The Molecular Basis of Metabolism; Evolution; Radiation and its Use in Biology: D. C. Heath & Co., 285 Columbus Ave., Boston, Mass. 02116. Tests and Teacher's Resource Book (for Laboratory Blocks) D. C. Heath & Co., 285 Columbus Ave., Boston, Mass. 02116.
13. Laboratory Innovations-Innovations in Equipment and Techniques for the Biology Teaching Laboratory: D. C. Heath & Co., 285 Columbus Ave., Boston, Mass. 02116.

14. Teachers' Handbook-Biology Teachers' Handbook: John Wiley & Sons, Inc., 605 Third Ave., New York, N. Y. 10016.

15. Biological Investigations for Secondary School Students-Research Problems in Biology: Investigations for Students, Series One, Two, Three, and Four: Doubleday & Co., 277 Park Ave., New York, N. Y. 10017.

16. Pamphlet Series- Animal Language; Bioelectricity; Biogeography; Biological Clocks; Biology of Coral Atolls; Biology of Termites; Biomechanics of the Body; Blood Cell Physiology; Cell Division; Cellulose in Animal Nutrition; Courtship in Animals; Early Evolution of Life; Ecology of the African Elephant; Growth and Age; Guideposts of Animal Navigation; Hibernation; Homeostatic Regulation; Metabolites of the Sea; Photoperiodism in Animals; Photosynthesis; Plant Systematics; Population Genetics; Present Problems About the Past; Slime Molds and Research: BSCS, P. O. Box 930, Boulder Colo. 80302.

17. Patterns of Life Series-Behavior of Tortoises; Biological Effects of Ionizing Radiation; Bird Migration; Antibiotics; Defensive Secretions of Anthropods; Energy Transfer in Ecological Systems; Island Life; Plant Morphogenesis: Rand McNally & Co., P. O. Box 7600, Chicago, Ill. 60680.

18. Bulletin No. 4-The Changing Classroom: The Role of the Biological Sciences Curriculum Study by Arnold B. Grobman: Doubleday & Co., 277 Park Ave., New York, N. Y. 10017.

19. Single Topic Inquiry Films (Super 8mm loop)-Social Behavior in Chickens; Prairies and Deciduous Forests; The Peppered Moth: A Population Study; Mimicry; Water and Desert Plants; Water and Desert Animals; Temperature and Activity in Reptiles; Mountain Trees-An Ecological Study; The Kidney and Homeostasis; Phototropism; Convergence; Australian Marsupials; The Intertidal Region; Life in the Intertidal Region; Predation and Protection in the Ocean; Mating Behavior in the Cockroach; An Inquiry-The Importance of the Nucleus; Mitosis; An Example of the Biological Significance of Color; Grouse-A Species Problem; Oak Populations; Regeneration in Acetabularia; Chemical Communication; Nerves and Heartbeat Rate; Prey Detection in the Rattlesnake; Structure, Function and Feeding Behavior in Herons; Frog Development; Imprinting; Engelmann's Inquiry into Photosynthesis; Behavior of a Purple Bacterium; Gene Flow in a California Salamander; Temporal Patterns of Animal Activity; Photoreception and Flowering; Flowering; Feeding Mechanisms of Oyster Drills; Planarian Behavior; Genetics of Bacterial Nutrition; Feeding Behavior of Hydra; Fossil Interpretation; Locomotion in an Amoeba. These films may be obtained from one of the following sources: Harcourt, Brace & World, Inc., 757 Third Ave., New York, N. Y. 10017; Houghton Mifflin Company, 110 Tremont St., Boston, Mass. 02107; Rand McNally & Co., P. O. Box 7600, Chicago, Illinois 60680.

20. Inquiry Slide Series (for daylight blackboard projection) available as a total program only: Structure and Function;

Control of Blood Sugar: A Homeostatic Mechanism; The Cell Nucleus; Plant-Animal Physiology; Sources of Plant Nutrition; Light and Plant Growth; Light Intensity and Photosynthesis; Cardiac Circulation; Control of Thyroid Secretion; Endocrine Pathways; Genetic Resistance to Pesticides; Effects of Thyroid Action; Control of the Pancreas; Dietary Deficiency in Chickens; Metamorphosis in Cecropia Moths; Control of Molting in Insects; Chromatography; Sensing Mechanisms in Homeostasis; Quantitative Relationships; Accuracy in Measurement: Harcourt, Brace & World, Inc., 757 Third Ave., New York, N.Y. 10017.

21. Self-Instructional Programs-Population Genetics: A Self-Instructional Program (other titles in preparation): General Learning Corporation, Silver Burdett Company Division, Morristown, New Jersey 07960.

22. BSCS Special Publication No. 4, The Teacher and BSCS Special Materials.

23. Special Publication No. 5, Laboratory Blocks in Teaching Biology.

24. Special Publication No. 6, New Materials and Techniques in the Preparation of High School Biology Teachers.

25. Special Publication No. 7, Life Sciences in the Middle School.

26. The Story of the BSCS (Information Film) for showing.

27. A BSCS Single Topic Inquiry Film Presentation (an orientation film for teacher groups on the inquiry uses of the BSCS Single Topic Films).

28. BSCS Newsletter.

29. BSCS Bulletin No. 1: Biological Education in American Secondary Schools 1890-1960, by Paul DeH. Hurd, 1961, $3.50.

30. BSCS Bulletin No. 2: Teaching High School Biology: A Guide to Working With Potential Biologists, by Paul F. Brandwein, Jerome Metzner, Evelyn Morholt, Anne Roe, and Walter Rosen, 1963, $2.00.

31. BSCS Bulletin No. 3: BSCS Biology-Implementation in the Schools, by Arnold B. Grobman, Paul DeH. Hurd, Paul Klinge, Margaret McKibben Lawler, and Elra Palmer, 1964, $5.00, clothbound; $3.50, paperbound.

32. BSCS Bulletin No. 4: The Changing Classroom: The Role of the Biological Sciences Curriculum Study by Arnold B. Grobman may be purchased from Doubleday & Co., 277 Park Ave., New York, N. Y. 10017.

L. MATERIALS AVAILABLE FREE: Items 22, 23, 24, 25, 26 and 27 on loan basis, 28.

M. MATERIALS PURCHASABLE:
(See listing under K for address and source)
1. $8.80
2. $8.76
3. $6.99
4. and 5. Approx. $5.00
6. from $34.00 to $46.00

7. from $3.25 to $16.50
8. $6.60
9. Approx. $24.00 pkg of 25
10. $2.70
11. $45.50 pkg of 35
12. Approx. $1.80
13. Approx. $2.20
14. $7.95
15. $1.25
16. .60 each
18. Approx. $6.95
19. Prices vary (thru Publishers)
20. $195.00 set of 20
29, 30, 31. See listing under K.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Spanish, Portuguese, Italian, French, Chinese, Japanese, Russian, Hebrew, Turkish and Thai.

P. ADDITIONAL MATERIALS BEING DEVELOPED: EMR (Educable Mentally Retarded); ES-70 (Human Ecology - Environmental Biology unit for sophomores); programmed materials; inquiry slides.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Estimated 20,000 to 30,000.
2. Number of students involved: Estimated at 5 to 6 million.
3. Number of schools involved: Estimated at 25,000.
4. Total number of teachers using any of the materials: Estimated 20,000 to 30,000.
5. Total number of students using any of the materials: Estimated 5 to 6 million.
6. Name and location of selected schools where the course is being taught: Berkley High School, Berkley, Mich.; William B. Travis High School, Austin, Tex.; Yuba City Union High School, Yuba City, Ca.; Baltimore City Schools, Baltimore, Md.; Pius XI High School, Milwaukee, Wisc.; Mercer High School, Mercer Island, Wa.; Nicolett High School, Milwaukee, Wisc.; Terra Nova High School, Pacifica, Ca.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: BSCS Staff members and consultants are available to consult teachers and school districts on the use of our materials.
2. Activities conducted for pre-service and in-service teacher training: Staff members and consultants have conducted numerous in-service and pre-service teacher training workshops. They are financed in a variety of ways - some by

the BSCS, many by the particular publisher of the materials being presented, some by individual school districts or agencies. Costs vary tremendously. As an example BSCS recently conducted a method of teaching biology course (BIO 400) for the University of Colorado. $400.00 was donated for equipment only; staff time was donated by BSCS.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: BSCS has two teacher preparation films, numerous model materials, such as the inquiry films and inquiry slides, BSCS Teachers' Handbook and many teacher's manuals and teacher's guides. Costs vary.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff and external agencies.

2. Pertinent published research studies: "The effectiveness of the BSCS Single Topic Films", American Biology Teacher, 31:241-43, 1969. Request bibliography from project director.

3. Brief abstract of in-house or unpublished research: None.

4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: Request bibliography from project director.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: See progress reports in newsletters No. 33 and No. 36.

V. PLANS FOR THE FUTURE: See progress reports in newsletters No. 33 and No. 36.

A. PROJECT TITLE: BOSTON COLLEGE MATHEMATICS INSTITUTE (BCMI).

B. PROJECT DIRECTOR: Stanley J. Bezuszka, S.J., Boston College, Chestnut Hill, Mass. 02167. (617)969-0100, Ext. 2235.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Visitor is welcome to visit institute classes to inspect experimental drill machines for classrooms and to discuss project activities with staff members.

D. PRINCIPAL PROFESSIONAL STAFF: Stanley J. Bezuszka, S.J.; Albert A. Bennett, Consultant and Lecturer; Mary E. Farrey and Margaret J. Kenney, Staff Assistants and Lecturers; Francis Torras, S.J., Consultant; Jacqueline Criscenti, Lecturer; Leo McDonough, S.J., Lecturer.

E. PROJECT SUPPORT:
1. Organizational agency: Boston College.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originator: Stanley J. Bezuszka, S.J.
2. Date and place of Initiation: June, 1957; Boston College.
3. Overall project purpose: To direct the education of teachers of mathematics in content, theory, and terminology of contemporary mathematics.

G. PRESENT COMMERCIAL AFFILIATIONS: The director and one of the Staff Assistants are affiliated with the publishing house William H. Sadlier, Inc., New York as author and/or consultant in a text book series.

H. PROJECT OBJECTIVES: The major objectives of the institute program are to offer courses and prepare instructional materials for teachers of mathematics. A distinguishing characteristic of the philosophy of this program is the emphasis on the structural approach to mathematics in combination with stress on the historical aspects of the subject.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Lectures, Seminars, Discussion groups, Computer assisted instruction.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: The institute program encompasses grade 7 through college sophomore directly, and the elementary grades to a certain extent, through consultation services. Emphasis is currently on the preparation of computer-oriented mathematics texts, correspondence courses for teachers, and a calculus text for secondary school students.

K. MATERIALS PRODUCED:

1. Contemporary Motivated Mathematics Book 1, grades 5-8.
2. Contemporary Motivated Mathematics Book 2, grades 6-9.
3. Cooperative Unit Study Program, Course 1.
4. Basic Systems and Applications.
5. The Wonder-Full World of Mathematics, a series of 14 films.
6. The Cooperative Unit Study Program, Course 2.
7. General Contemporary Mathematics.
8. Contemporary Progress in Mathematics.
9. Sets, Operations, and Patterns.
10. Heritage Builders in the Arts and Sciences.

L. MATERIALS AVAILABLE FREE: 30-day examination copies only of texts are available. Descriptive brochures of the institute project are available free upon request.

M. MATERIALS PURCHASABLE:

1. $1.00.
2. $1.00.
3. $5.00 for teacher edition; $5.00 for student edition.
4. $4.75 for text; $3.70 for teachers guide; $2.20 for soft bound text.
5. Rental cost per film $5.00.

6-10. Contact project for prices.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Additional booklets in the Contemporary Motivated Mathematics series.

Q. PROJECT IMPLEMENTATION: Records of this type are not kept. A few schools where course is being taught are: Watertown Public Schools, Watertown; Waltham Public Schools, Waltham; Lowell Public Schools, Lowell; Brookline Public Schools, Brookline, Mass; Eureka Public Schools, Eureka, and Monterey Public Schools, Monterey, California.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Members of the staff make visits both to school systems which are and which are not using project materials.
2. Activities conducted for pre-service and in-service teacher training: On campus, National Science Foundation-sponsored in-service institutes are provided during the academic year. In addition, the director and staff have conducted in-service programs in other locations. These are financed by local organizations and schools.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers:

A limited number of specialized correspondence programs are available. These are listed as courses Mt. 121 and Mt. 122. Tuition is $45 per credit. The texts, Cooperative Unit Study Program, Course 1 and Course 2, used for these courses are available for teachers of teachers to purchase.

S. PROJECT EVALUATION:

1. Has the effectiveness of the material been evaluated? No.
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished research: Write to headquarters for Cumulative Report, 6/57 - 9/68.
4. Additional evaluative data available for interested individuals: Copies of Cumulative Report are available upon request.

T. PROJECT PUBLICITY:

Margaret J. Kenney, "The Boston College Mathematics Institute Program", Journal of Research in Science Teaching, Vol. 2, pp. 335-344 (1964).

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:

Operation of a summer, in-service, academic year institute for secondary school teachers of mathematics; consultation services for an elementary mathematics text series covering grades 1-6; authoring text series 7-8; operation of a mathematics workshop for teachers of mathematics at the University of the West Indies, Kingston, Jamaica and Robert Louis Stevenson School, Pebble Beach, California; publication of a series of drill for fun booklets for the students at grade level 5-10.

V. PLANS FOR THE FUTURE:

The future plans include the continuation of the program of institutes for teachers, text book revisions, and experimentation with laboratory devices for the mathematical classroom.

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A. PROJECT TITLE: CALIFORNIA MATHEMATICS IMPROVEMENT PROGRAMS, SPECIALIZED TEACHER PROJECT.

B. PROJECT DIRECTOR: Mrs. Bryne Bessie Frank, Consultant in Mathematics, State Department of Education, 721 Capitol Mall, Room 444, Sacramento, California 95814. (916)445-5361.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Summer training workshops during August.

D. PRINCIPAL PROFESSIONAL STAFF: Leonard M. Warren, Coordinator; staff of 30 instructors; and Robert P. Dilworth, Research Director.

E. PROJECT SUPPORT:
1. Organizational agencies: California Department of Education contracting with San Diego County Department of Education.
2. Funding agency: Legislative appropriation, State of California.

F. PROJECT HISTORY:
1. Principal originator: Legislation proposed by the late California State Senator George Miller in the 1967 legislative session.
2. Date and place of Initiation: Summer 1968; California.
3. Overall project purpose: To improve elementary pupil achievement in mathematics by giving teachers in-service training in mathematics laboratory techniques and instructional materials to use in the classroom (see H below).

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Elementary teachers, after taking the summer course, teach their own and one other class at the same grade level, through a trade-off arrangement. The philosophy and techniques of the training are similar to Madison Project and Nuffield Project of England. This project is a three-year pilot project which began in 1968.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics, grades 2, 3, 5 and 6 - heterogeneous groups.

K. MATERIALS PRODUCED: None.

L. MATERIALS AVAILABLE FREE: Guidelines for applications for California school districts.

To be available soon - summary of data analysis of the first year's (1968-69) research. Obtain from the director.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Not answered.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 1968-69 - 135 teachers; 1969-70 - 857 teachers; 1970-71 - 1200 teachers.
2. Number of students involved: Average of 30 to each teacher plus equal number of control classes.
3. Number of schools involved: In the current year (1969-70) there are 236 school districts involved.
4. Total number of teachers using any of the materials: To date there are about 1,000 teachers.
5. Total number of students using any of the materials: 60,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Very close estimate.
7. Name and location of selected schools where the course is being taught: Too many to mention. This information is available from Source B.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Two followup conferences per academic year.
2. Activities conducted for pre-service and in-service teacher training: Main purpose of the project is to conduct in-service training. This is a ten-day live-in arrangement financed by the project. Funding includes stipends, travel and living expenses, and $100 worth of instructional materials for teacher to take back to classroom. Approximate cost has been $500 per teacher, for all costs of the project including research and evaluation.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: One set of videotapes developed for the project by Robert Wirtz consists of ten half-hour lessons for teachers on creative ways to develop computational skills. 16 mm film copies are available to California schools at cost (approximate $500 for the set) and from Mr. Wirtz for schools outside the state.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by Dr. Robert P. Dilworth, California Institute of

Technology.

2. Pertinent published research studies: Not yet completed - will be published when ready.

3. Brief abstract of in-house or unpublished research: Generally the in-service program had a very strong effect. The trade-off principle doubles the effectiveness of the program.

4. Additional evaluative data available to interested individuals: At some date in the near future, when the final analysis is in, a summary will be prepared for dissemination to interested individuals. Available from the director.

T. PROJECT PUBLICITY: This project is widely known in California. The Bulletin of the California Mathematics Council carries information about it regularly. Progress reports are regularly made to the California State Board of Education.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: The project was in the planning stages in 1968. Since that report, we have successfully completed two years of training courses and pupil testing and are preparing for the third and last year's training of 1,200 teachers.

V. PLANS FOR THE FUTURE: The project is beginning its last year of pilot operation unless the Legislature votes to extend its life and provide funding for the extension.

A. PROJECT TITLE: CAMBRIDGE CONFERENCE ON SCHOOL MATHEMATICS (CCSM).

B. PROJECT DIRECTOR: Mr. Hugh P. Bradley, Education Development Center, 55 Chapel Street, Newton, Mass. 02160. (617)969-7100, ext. 440.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Not answered.

D. PRINCIPAL PROFESSIONAL STAFF: A number of people, on a consulting basis, developing materials under the direction of a Steering Committee, including: Prof. W. T. Martin, MIT; Prof. P. J. Hilton, Cornell University; Prof. Andrew Gleason, Harvard; Prof. Earle Lomon, MIT; Prof. George Springer, Indiana University.
Consultants include: Prof. E. Weiss, Boston University; Prof. S. Sternberg, Harvard; Prof. L. Henkin, University of California, Berkeley; Prof. J. Callahan, Boston State College.

E. PROJECT SUPPORT:
1. Organizational agency: Education Development Center.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Prof. W. T. Martin, MIT; Mr. Gilbert Oakley, Jr., Education Development Center.
2. Date and place of Initiation: 1963; Cambridge, Mass.
3. Overall project purpose: To explore curriculum reform needs in mathematics with a view to a long range future.

G. PRESENT COMMERCIAL AFFILIATIONS: Houghton Mifflin.

H. PROJECT OBJECTIVES: The program grew out of a conference in 1963 which explored curriculum reform needs in mathematics. The report of the conference, Goals for School Mathematics, outlined exploratory thinking on mathematics curriculum. While it was recognized that the CCSM is not primarily engaged in the preparation of materials for classroom use, it was felt that it was necessary to develop and try out some materials to demonstrate the feasibility of the goals. Thus, a continuing part of the program has been work, with a limited number of schools, developing and trying out units. Copies of the working papers, listed in question K, are available upon request from ERIC. In recent years the attention of the program has been turned towards the problem of teacher education and the integration of mathematics and science education in the lower schools.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Not answered.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics - Kindergarten - 12th grade and teacher education.

K. MATERIALS PRODUCED:

Feasibility Studies:

1. A Proposed Syllabus for the Seventh Grade.
2. Elementary Modern Mathematics from the Advanced Standpoint.
3. Proposed Program for the Tenth Grade.
4. Order Structure in Elementary Mathematics.
5. A Problem.
6. Units.
7. Probability.
8. Notes on Desirable Responses at End of Sixth Year.
9. Stream of Ideas on Checks, Approximations, and Order of Magnitude Calculations.
10. Complex Numbers Leading to Trigonometry.
11. Use of Negative Digits in Arithmetic.
12. Use of Shift Theorem in Differential Equations.
13. Topology in Tenth Grade and After.
14. SMSG and the "Gifted Child".
15. What High School Juniors and Seniors Don't Know.
16. The Use of Units.
17. Exploration.
18. The Exponential Function.
19. A Proposed Course in Ninth Grade Geometry.
20. Multiplication of Negative Numbers.
21. Kindergarten.
22. Morse School--First Grade (Inequalities Unit).
23. Morse School--Second Grade (Multiplication and The Symmetry of Squares and Triangles).
24. Morse School--Third Grade (Chip Trading & Symmetry Units).
25. Morse School--Third and Sixth Grades (Graphs and Their Applications).
26. Morse School--Third Grade (Vector Geometry).
27. Morse School--Sixth Grade (Elementary Number Theory) Superseded by No. 35.
28. Morse School--Slopes and Limits (Lessons & Commentary).
29. Report of Activities in Cambridge during July and August, 1964 under CCSM.
30. Experimental Teaching.
31. Palo Alto--Second Grade (Geometry, Logic and Matrices).
32. Stanford--Eighth Grade (Geometry through Symmetry).
33. Progress Reports on Estabrook Project, Covering March 1964 through June 1965.

34a. Demonstration of Mirror Cards to Estabrook Teachers.

34b. Informal Geometry for Young Children.

34c. Symmetry Motions for Elementary School (Parts I and II).

35. Hosmer School--Sixth Grade 1964-65 (Elementary Number Theory).
36. Report of SMSG/CCSM Conference in March, 1965.

37. Collected Reports of CCSM Writing Conference, Summer, 1965.
38. Inequalities and Real Numbers as a Basis for School Mathematics.
39. Geometry Report.
40. Symmetry Motion Classes.
41. Probability Lessons at Hancock School, Lexington.
42. "Inequality" Lessons at Adams School, Lexington.
43. An Experimental Text in Transformational Geometry.
44a. Geometry--Teachers' Guide.
44b. Geometry--Children's Worksheets.
45. Averages, Areas and Volumes.
46. A Second-Grade Experiment in Mathematics.
47. Goals for School Mathematics, 1963.
48. Goals for Mathematical Education of Elementary School Teachers, 1967.
49. Goals for the Correlation of Elementary Science and Mathematics, 1969.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE:

Item 47	$2.00
Item 48	2.12
Item 49	2.20

From: Houghton Mifflin Company, 2 Park Street, Boston, Massachusetts.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION: Not answered.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Not answered.
2. Activities conducted for pre-service and in-service teacher training: MODERN MATHEMATICS FOR ELEMENTARY TEACHERS: A Laboratory Approach.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION: No evaluation has been carried out.

T. PROJECT PUBLICITY: Articles have appeared in the Arithmetic Teacher and the Instructor. Recommendations of the program have been discussed occasionally by persons at MAA and NCTM meetings.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Experimental use of Modern Mathematics for Elementary Teachers: A Laboratory Approach in three teacher education colleges.

V. PLANS FOR THE FUTURE: A new program, Unified Science and Mathematics in Elementary Schools. USMES has been funded to develop ideas contained in "Goals for the Correlation of Elementary Science and Mathematics".

A. PROJECT TITLE: CENTER FOR ENVIRONMENTAL EDUCATION.

B. PROJECT DIRECTOR: Robert E. Collins, 5400 Glenwood Avenue, Minneapolis, Minnesota 55422. (612)544-8971.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Classroom laboratories (2); library; photo laboratory.

D. PRINCIPAL PROFESSIONAL STAFF: Robert E. Collins, Center Director; Barbara Clark, Program Coordinator; Edward Landin, Curriculum Coordinator; Michael Naylon, Field Services Coordinator; John Heitkamp, Education Specialist; Robert O'Hara, Education Specialist; Joann Current, Curriculum Specialist; Karen Jostad, Curriculum Specialist; Carl Vogt, Field Service Specialist.

E. PROJECT SUPPORT:
1. Organizational agency: Minnesota Environmental Sciences Foundation, Inc.
2. Funding agency: Minnesota Environmental Sciences Foundation, Inc.

F. PROJECT HISTORY:
1. Principal originator: Golden Valley Public Schools.
2. Date and place of Initiation: July 1, 1967; Golden Valley, Minnesota.
3. Overall project purpose: To improve the quantity and quality of education pertaining to man's relation to his environmnet.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:
1. To develop and test model staff development programs in the environmental sciences for elementary and secondary school teachers and administrators, college instructors, youth and adult organization leaders.
2. To develop and test inquiry - oriented, interdisciplinary, instructional materials and programs based upon socio-ecological interrelationships.
3. To assist schools and other agencies to identify, develop, and utilize available natural areas and other community resources as environmental laboratories, i.e., the everywhere classroom.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Seminars, Discussion groups, Field problems.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Embraces several subject areas as they pertain to matters of environmental management. K-12, elementary and secondary school teachers, youth and organization leaders.

K. MATERIALS PRODUCED:

1. Brine Shrimp - grades 1, 2, 3-5, Units I & II, $1.00.
2. Population Variation - grades 4-7, $1.00.
3. Minnows and Models - grades 4-6, $1.00.
4. Color and Change - grades K-2, $1.00.
5. Soil Sampling - Water Holding Capacity - grades 1-6, .50.
6. Soil Sampling - Acidity/Alkalinity - grades K-6, .50.
7. Stream Profiles - grades 4-9, S1.00.
8. Plant Puzzles - grades 1-6, $1.00.
9. Variations Within a Species - grades 4-8, .50.
10. Contour Mapping - grades 4-9, $1.00.
11. Succession in a Micro-Aquarium - grades 5-9, .50.
12. Measuring Techniques - grades 3-9, .50.
13. Tubs of Tiles - grades 1-2, .50.
14. Button Bags - grades 3-9, $1.00.
15. Population Sampling - grades 3-8, .50.
16. Liquids and More Liquids - grades 2-6, .50.
17. Population Growth - grades 6-12, $1.00.
18. Snow and Ice - grades 1-6, $1.00.
19. Shadows - Part I - grades 1-6; Part II and III - grades 5-8, $1.00.
20. Wind - grades 3-6, $1.00.
21. Plants in the Classroom - grades 3-6, $1.00.
22. Nature's Art - grades 3-6, $1.00.
23. Tree Watching - grades K-6, $1.00.
24. Habitat Study - grades 3-7, $1.00.
25. Transect Study - grades 5-9, $1.00.
26. Transect Activities I - grades 4-9, $1.00.
27. Transect Activities II - grades 4-9, .50.
28. Vacant Lot Studies - grades 5-9, $1.00.
29. Outdoor Activities Collection - grades 1-12, $2.00.
30. Man's Habitat - The City - grades 4-9, $1.00.
31. Field Activities Package: a. The Soil Acidity Test. b. A Survey of Life Forms Closely Associated With the Soil. c. Calculating the Runoff From a Watershed. d. Working with Slopes, Profiles, and Contours. e. Testing for Soil Nitrogen Content. $1.00.
32. Nature Hunt - grade K-1 & Special Education, $1.00.
33. Photography for Kids - grades 4-8, $1.00.

L. MATERIALS AVAILABLE FREE: Newsletter Ecolog, address as in B.

M. MATERIALS PURCHASABLE: See K. From: Project director. Make checks payable to: Independent School System No. 275.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: No plans for translation.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Problem-Action Programs using multi-disciplinary approach to solutions of environmental problems.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Not applicable.
2. Total number of teachers using any of the materials: 6000.
3. Total number of students using any of the materials: Not known.
4. Are the totals stated in 1, 2, and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: St. Louis Park Public Schools, St. Louis Park, Minnesota; Hopkins Public Schools, Hopkins, Minnesota; Minneapolis Public Schools, Minneapolis, Minnesota.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Consultant services are available to teachers, administrators and youth group leaders. Services usually pertain to local program development and implementation including inservice techniques and strategies; use and development of curriculum; and the identification and development of natural areas for use as outdoor laboratories.
2. Activities conducted for pre-service and in-service teacher training:

No. 100: INVESTIGATIONS IN THE ENVIRONMENTAL SCIENCES I. Designed for: Elementary and junior high teachers, administrators, and youth group workers.
NATURE OF PROGRAM: This course is designed to focus on the participant's attention on the natural environment as a resource for science education activities. The participants will be actively engaged in a series of science activities much in the same manner that the participants could, in turn, involve their students. The investigations that will be employed throughout the course, will be for the most part, those developed by the Center.
TIME AND DURATION: Class will meet from 4:00 - 6:00 P. M. for ten consecutive weeks. Two sessions will be offered: Section A begins on Tuesday, September 16; Section B begins on Thursday, September 18. Cost: $20.00.

No. 101: INVESTIGATIONS IN THE ENVIRONMENTAL SCIENCES II. Designed for: Elementary and junior high teachers, administrators, and youth group workers.
NATURE OF PROGRAM: This course is designed to focus the participant's attention on the natural environment as a resource for science education activities. The participants

will be actively engaged in a series of science activities much in the same manner that the participants could, in turn, involve their students. The investigations that will be employed throughout the course, will be for the most part, those developed by the Center. The investigations used in 101 will be a different series than those of course 100.
TIME & DURATION: Ten two-hour sessions to begin on Wednesday, September 17 from 4:00 - 6:00 P. M. Cost: $20.00.

No. 106: EXPANDING THE EDUCATIONAL TERRITORY: IDEAS FOR A MULTI-DISCIPLINE CURRICULUM.
Designed for: Elementary teachers and administrators.
NATURE OF PROGRAM: The purpose of this program is to explore the usefulness of certain extra-classroom sites as supplementary educational resources. The content of the program and the strategies employed during the investigations will be drawn from many disciplines with particular emphasis upon the social and ecological sciences. Field trips to cemeteries, railroad tracks and municipal dumps are planned. Participants will be encouraged to contribute ideas for additional explorations during the conduct of the course. An outcome of the course will be a description of ways to utilize new educational environments as bases for multi-discipline learning experiences.
TIME AND DURATION: Ten two-hour sessions to meet each Monday from 4:00 - 6:00 P. M. beginning September 15. Cost: $20.00

No. 104B: LABORATORY EXPERIENCES IN THE EARTH SCIENCES.
Designed for: Elementary and secondary teachers, administrators, and youth group workers.
NATURE OF PROGRAM: An interdisciplinary course integrating aspects of Geology, Astronomy, and Meteorology. Emphasis will be given to those field and laboratory investigations in the earth sciences that might, in turn, be used with elementary school students in a classroom situation.
TIME AND DURATION: Ten two-hour sessions beginning on Monday, September 15 at 4:00 P. M. Cost $20.00.

No. 303: PHOTOGRAPHY FOR CLASSROOM USE.
Designed for: Elementary and secondary teachers, administrators, and youth group workers.
NATURE OF PROGRAM: This course is designed to provide teachers with a practical knowledge of photography so they may produce visual aids which will enrich their instructional programs. In addition, ideas will be investigated as to how student photography can add a new dimension to class activities. The class will begin with a brief discussion of basic photographic principles and darkroom techniques. Participants will produce and prepare for display, various materials such as photographs, slides, filmstrips, charts, diagrams, and 8MM movies. A wide variety of materials, methods, and subjects will be available for use. The Environmental Science Center's

instructional media laboratory will be at the participant's disposal. The course is limited to 20 participants.
TIME AND DURATION: Ten two-hour sessions beginning at 4:00 P. M. on Wednesday, September 17. Cost: $20.00 plus a small laboratory fee to cover the cost of certain supplies.

No. 304: SCHOOL SITE DEVELOPMENT.
Designed for: Elementary and secondary teachers and administrators.
NATURE OF PROGRAM: A course designed to assist teachers and/or administrators in evaluating and utilizing environmental education study areas. Recommendations relevant to individual sites will be discussed and developed. Assistance will be given in mapping, design and utilization of land management plots, acquatic study areas, brush and stonepile sand transect study areas, and other facilities where applicable. Participants will be encouraged to develop a written site study plan for their individual school with assistance from ESC personnel.
TIME AND DURATION: Five four hour sessions - 8:00 A. M. to 12:00 noon, starting Saturday, September 20. Cost: $20.00.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Those materials listed in (K) above.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: None.
4. Additional evaluative data available to interested individuals: Yes, write Center requesting evaluation report.

T. PROJECT PUBLICITY:
1. "The Everywhere Laboratory," Minnemath Center Reports, Vol. 6, No. 1, 1968.
2. "The Field Trip: A Dread and a Delight" Science Activities, Feb. 1970.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Continued emphasis upon curriculum development, inservice training programs, and outdoor laboratory development.

V. PLANS FOR THE FUTURE: As in (U) above.

A. PROJECT TITLE: CENTRAL IOWA LOW ACHIEVER MATHEMATICS PROJECT (CILAMP).

B. PROJECT DIRECTOR: Jack R. Williams, Director, Central Iowa Low Achiever Math Project, 1350 E. Washington, Des Moines, Iowa 50316. 265-5363.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Visitation in teachers' classrooms.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. Jack R. Williams - Director, Central Iowa Low Achiever Math Project; Mr. A. Wilson Goodwin - Supervisor, Department of Mathematics, Des Moines Independent Community School District; Mr. Les Lewis - Coordinator, Central Iowa Low Achiever Math Project.

E. PROJECT SUPPORT:
1. Organizational agency: Des Moines Independent Community School District.
2. Funding agencies: Title III, ESEA.

F. PROJECT HISTORY:
1. Principal originators: Des Moines Independent Community School District and Central College, Pella, Iowa.
2. Date and place of Initiation: July, 1967; Des Moines, Iowa.
3. Overall project purpose: To increase the level of achievement in junior high schools through in-service training and development of materials.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:
The low achieving mathematics students at the junior high school level will:
1. Display an interest in mathematics related activities.
2. Feel successful and potent in applying his mathematical skill in problem solving.
3. Demonstrate a mathematical literacy.

Mathematics teachers at the junior high school level will:
1. Use a multiple activity approach.
2. Provide a pleasant and stimulating learning atmosphere.
3. Provide learning tasks appropriate to students needs.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Lectures, Seminars, Discussion groups. We emphasize the multiple activity approach to teaching.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics, grades 7-9.

K. MATERIALS PRODUCED:

1. The GIMMICK booklet is divided into three major areas--those which can be used as drill exercises, those which are games or puzzles, and those which serve to introduce new concepts or are simply of high interest. We have attempted to make each gimmick self-explanatory by listing the purpose and method for each. You will note that references have also been included for many of them. The booklet is a collection of ideas which have worked for those teachers involved in CILAMP.
2. The ROMAN NUMERALS unit was designed to teach the Arabic system of numeration rather than the Roman system per se. It has a purely fictitious setting from which a high degree of interest is generated. Teachers who have tried this unit have found that reading the story to the students proves to be the most effective method. In some cases, the students have taken turns reading the story to the rest of the class.
3. The INTRODUCTION TO FLOW CHARTING unit was developed because of an expressed need on the part of the teachers for a guide to the teaching of flow charting. It is meant to be only a guide from which the teacher may draw ideas and techniques for his or her class. It should be pointed out that teachers who have used flow charting find that it is easy to overuse this technique.
4. LOST IN SPACE is an attempt to circumvent the traditional difficulties encountered when fractions are studied. This unit has as its goal the teaching of the rational number system operations via ordered pairs of whole numbers (natural numbers). A fictitious story about space ships and distant galaxies serves as the vehicle to introduce this study of the rational numbers.

5. - 6. HOW IT MIGHT HAVE BEEN is an intriguing narrative about a cave people who developed a base eight counting system as opposed to our base ten system. Their reason for using only eight of their ten fingers as aids in counting was based on their belief that thumbs were ugly! This fictitious story is presented in two sections. The first section consists of the narrative which is the teacher's copy. The second section is the workbook and summary which is given to the student. They will be sold separately.

7. We have three units involving measurement. The first one is simply entitled MEASUREMENT. It deals with a make-believe system of measurement developed by a make-believe doctor Squint for use with his painalyzer (a machine which measures headaches). The purpose of this unit is to teach conversion within and between measurement systems.
8. AREA MEASUREMENT is the second unit which deals with the problems of measurement. It is a non-rigorous treatment of the problems involved in measuring the area of such figures as the triangle, square, rectangle, parallelogram, and circle.

It fosters a high degree of student involvement and activity.

9. The third unit dealing with measurement is THE PROTRACTOR unit. THE PROTRACTOR is another fictitious story of how what we now know as the protractor might have been developed. It is student activity centered.

10. The TANAGRAMS unit is based on an ancient Chinese puzzle (Tangram) consisting of seven geometric shapes and a set of silhouettes. The seven pieces are used to duplicate the silhouettes. TANAGRAMS allows for maximum student involvement and attempts to lead the student to discover the patterns and relationships among the seven pieces. Such things as area, similarity among figures, and congruence are discussed.

11. Also, we are now able to offer a revised edition of the LAMP booklet. This booklet was first published in 1966 by Des Moines Public Schools. It consists of a series of materials which can be used with a variety of students at a variety of levels. Mr. Joseph Zimmerman wrote the original booklet and has also edited, revised, and extended the new edition. It is primarily aimed at the low achiever but could, as many of our materials can, be adapted at most any level of instruction.

12. The ENRICHMENT STUDENT PROJECTS (E. S. P.) booklet includes a description and instructions for using such things as the Tower of Hanoi, ten-men-in-a boat, and numerous puzzles, all of which require the student to manipulate, observe, and record. They are designed to be used in conjunction with class work, not in lieu of it. Students are encouraged to try the E. S. P. 's before class, after completion of assignment, or during their free time. We have developed a series of approximately fifteen E. S. P.'s along with a description and a set of instructions for each of them.

13. GRAPHING PICTURES is a set of directions for students to follow in order to gain practice in using Cartesian coordinates. Although the materials have high student interest, they are made so that they require a minimum of teacher effort.

14. THE FIRST PROBABILITY PROGRAM -- A Crowderian style of programing is used to allow students to procede at their own pace. The unit covers the most basic concepts of probability and can be used as an overview or review of the study of probability. It is a program aimed at concepts rather than vocabulary.

15. MATH IN SPORTS is a collection of worksheets using seven sports to provide motivated practice in mathematics. Suggestions for producing more worksheets are included along with answers to the worksheets.

16. ROAD MAP MATH is an attempt by one of the project teachers to supply meaningful and motivating mathematics drill using a road map of Iowa as the vehicle. It integrates mathematics and social studies and has been used primarily with seventh grade classes of low achieving mathematics students.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: Available from project headquarters.

Item 1	$2.00
Item 2	1.00
Item 3	.75
Item 4	1.25
Item 5	1.00
Item 6	1.00
Item 7	1.25
Item 8	1.00
Item 9	.75
Item 10	1.00
Item 11	2.00
Item 12	1.00
Item 13	1.00
Item 14	.50
Item 15	.75
Item 16	1.00

A complete set of all materials $15.00.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. Ratio and Proportion.
2. Measurement (Part II).
3. Fractions.
4. Factoring.
5. Bulletin Board Ideas.
6. Decimals.

The above booklets are arranged according to student behavioral objectives.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 58 project teachers.
2. Number of students involved: 3000.
3. Number of schools involved: 40.
4. Total number of teachers using any of the materials: Not answered.
5. Total number of students using any of the materials: Not answered.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught:

West Des Moines, Iowa - Stillwell, Jr. High.

Des Moines, Iowa - Weeks Jr. High; Meredith Jr. High; Brody Jr. High; Kurtz Jr. High.
Knoxville, Iowa - Knoxville Jr. High.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using your materials: Staff is available to participating teachers.
2. Activities conducted for pre-service and in-service teacher training:
Inservice: 4 - two day workshops in Iowa.
4 - three day "communication-content" workshops in Iowa.
Consultant services to many schools in Iowa financed by project and/or local schools.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not available at this time.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Evaluation taking place at present time.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: None.
4. Additional evaluative data available to interested individuals: "Student Summer School Activity 1968", from project office.

T. PROJECT PUBLICITY: None.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Summer workshops and winter courses have been held throughout 1968 and 1969 for the purpose of developing new ideas and evaluating units as they are produced. Additional teachers have been trained to participate in the project.

V. PLANS FOR THE FUTURE: The final year of the project will emphasize dissemination, evaluation and procedures for continuing activities when federal funds are depleted. Four two-day workshops for teachers in Iowa outside of the project area are being conducted at the present time. Fewer visitations are being made to project teachers and Saturday workshops are being held once a month. A reduction in staff has limited these activities. Workshops using project teachers as consultants will be the thrust of the final year of federal funding.

A. PROJECT TITLE: CHEMICAL EDUCATIONAL MATERIALS STUDY (CHEMS).

B. PROJECT DIRECTOR: George C. Pimentel, Professor of Chemistry, University of California, Berkeley, California 94720. (415)642-3835.

C. PROJECT HEADQUARTERS:
1. Contact: Mr. David W. Ridgway, Executive Director or Mrs. Ruth Wightman, Secretary, Lawrence Hall of Science, University of California, Berkeley, California 94720. (415)642-3835.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. David W. Ridgway, Executive Director; Mrs. Ruth Wightman, Secretary.

E. PROJECT SUPPORT:
1. Organizational agencies: University of California, Berkeley, and (until 9/63) Harvey Mudd College, Claremont, California.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Glenn T. Seaborg, Chairman, Steering Committee; J. Arthur Campbell, Director; George C. Pimentel, Editor of Text.
2. Date and place of Initiation: January 9, 1960; University of California.
3. Overall project purpose: To improve the teaching of chemistry at the high school level.

G. PRESENT COMMERCIAL AFFILIATIONS: W. H. Freeman and Company, publisher, written materials. Modern Learning Aids, distributor, film materials.

H. PROJECT OBJECTIVES: To develop a course based upon experiment where observations and measurements lead to the development of unifying principles, and then these principles are used to interrelate diverse phenomena. Heavy reliance is placed upon laboratory work, so that chemical principles can be drawn directly from student experience. Not only does this give a correct and non-authoritarian view of the origin of chemical principles, but it gives maximum opportunity for discovery, the most exciting part of scientific activity. The objectives are stated fully in the Foreword to the CHEM Study text, "Chemistry, An Experimental Science", and in Chapter 1 of the CHEM Study history, "The CHEM Study Story". The CHEM Study course differs from conventional courses in that it deemphasizes memorization and regurgitation, and recommends the use of open book tests.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Lectures, Seminars, Discussion groups, Computer assisted instruction, 26 Motion Pictures, 17 Teacher Training Films, 13 Film Loops.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Materials were prepared for the 11th or 12th grade high school level for average ability students.

K. MATERIALS PRODUCED:

1. Chemistry--An Experimental Science (textbook, 466 pages, clothbound).
2. Chemistry--An Experimental Science (laboratory manual, 138 pages, paperbound).
3. Chemistry--An Experimental Science (teacher's guide, 785 pages, paperbound).
4. Programmed instruction pamphlets: Slide Rule (64 pages); Exponential Notation (31 pages).
5. Achievement tests (set of 7 open-book, multiple choice tests, including 5 tests each covering 3 or 4 chapters, a semester final and a year final); 2 series, designated 1963-64 and 1964-65.
6. "The CHEM Study Story"---the development and philosophy of CHEM Study. Richard J. Merrill and David W. Ridgway, 1969.
7. Motion pictures:
   (a) 26 films integrated into the course.
   (b) 2 teacher training films by George C. Pimentel.
   (c) A film to acquaint laymen with the course: "A Chance To Wonder Why"--14 minutes.
   (d) A film to acquaint educators with the course: "CHEM Study: Information for Educators"--19 minutes.
8. A series of 17 half-hour teacher training films which may be used on TV or for screening.
9. Thirteen 8mm film loops.
10. Teacher's Guide to the CHEM Study Films (102 pages, paper bound).
11. CHEM Study Newsletter (issued as needed).
12. Bibliography of journal references to the CHEM Study materials.

L. MATERIALS AVAILABLE FREE: Items 11 and 12, from project.

M. MATERIALS PURCHASABLE: Items 1 - 6, available from W. H. Freeman and Co., 660 Market Street, San Francisco, Calif. 94104 (list prices F. O. B. shipping point, subject to normal educational discount). Items 7 - 10 available from Modern Learning Aids, 1212 Avenue of the Americas, New York, N. Y. 10036. Obtain prices from Modern Learning Aids.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED:
Written materials: Chinese, French, Hebrew, Hindi, Thai, Gujarati, Japanese, Spanish, Turkish, Korean, Portuguese.
Film materials: Danish, French, Swedish, Spanish, German, Italian, Greek.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None. Additional translations of films and text are in process.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 10,000.
2. Number of students involved: 500,000.
3. Number of schools involved: 7,000.
4. Total number of teachers using any of the materials: 12,000.
5. Total number of students using any of the materials: 600,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: 40 to 50% of high schools in the United States.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: A list of consultants is available from CHEM Study headquarters. Arrangements for such consultants must be made and paid for by schools using their services.
2. Activities conducted for pre-service and in-service teacher training: CHEM Study Summer Institutes financed by the National Science Foundation.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: 17 Teacher Training Films available from Modern Learning Aids. Purchase: $1,290. Rental: at $7.00 per unit--$119.00.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff and others.
2. Pertinent published research studies: CHEM Study headquarters will provide bibliography of articles in journals. This bibliography also may be found in the "CHEM Study Story", published by W. H. Freeman and Co. $2.50.
3. Brief abstract of in-house or unpublished research: Complete information available in the "CHEM Study Story" available from W. H. Freeman and Co.
4. Additional evaluative data available to interested individuals: See "The CHEM Study Story".
Journal of Chemical Education, January 1970 - Volume 47, No.1, pages 79 - 84. Bibliography of articles may be obtained from CHEM Study headquarters.

T. PROJECT PUBLICITY:

1. Earl L. Pye and Kenneth Anderson, "Test Achievements of Chemistry Students", The Science Teacher, Feb. 1967, pp. 30-32.
2. J. S. F. Pode, "C. B. A. and CHEM Study: An Appreciation" Journal of Chemical Education, Feb. 1966, p. 98.
3. "CHEM Study---An Editorial", In Chemistry and Industry (London), January 16, 1965, p. 99.
4. P. G. Ashmore, "On Teaching High School Chemistry", Science, June 4, 1965, pp. 1312 - 1314.
5. R. G. Rainey, "A Comparison of the CHEM Study Curriculum and a Conventional Approach in Teaching High School Chemistry", School Science and Mathematics, June 1964, pp. 439 - 544.
6. "CHEM Study---Its Impact and Influence", High School Journal, January 1970. School of Education, The University of North Carolina, Chapel Hill, North Carolina.
7. Journal of Chemical Education, January 1970, Volume 47, No. 1, pp. 79 - 84.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Translation of written materials and films into additional foreign languages.

V. PLANS FOR THE FUTURE: Distribution of written material and films both in English and as translated will be continued. A minimum staff will be maintained to supervise remaining business activities and to carry out contractual obligations.

A. PROJECT TITLE: CHILD-STRUCTURED LEARNING IN SCIENCE (CSLS).

B. PROJECT DIRECTOR: Dr. Charles C. Matthews, Assoc. Professor of Science Education, 414 Education Building, Florida State University, Tallahassee, Florida 32306. (904)599-3452.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Equipment display, videotapes of children and teachers participating in program, videotaped presentations for children, videotaped presentations for teachers.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. Paul Westmeyer, Professor & Head, Science Education Department, Florida State University; Dr. Ronald Good, Assistant Professor, Science Education Department, Florida State University; Mrs. Martha G. Camp, Instructor, Science Education Department, Florida State University; Mr. David McMurtrey, Research Associate, Science Education Department, Florida State University.

E. PROJECT SUPPORT:
1. Organizational agency: Department of Science Education, Florida State University.
2. Funding agencies: Florida Department of Education; Florida State University.

F. PROJECT HISTORY:
1. Principal originators: Dr. Paul Westmeyer, Dr. Charles Matthews, Dr. Darrell Phillips, Mrs. Martha G. Camp.
2. Date and place of Initiation: January, 1968; Florida State University.
3. Overall project purpose: Development of a K-6 science curriculum for children and teachers based on the nature of science and the nature of intellectual development of children.

G. PRESENT COMMERCIAL AFFILIATIONS: OMSI/KIT, Inc. - produces and distributes equipment kits.

H. PROJECT OBJECTIVES: The overall objectives of the CSLS project are to design science materials for use by children of all cognitive ability ranges and socio-economic levels and to design materials for use by a local coordinator in training teacher to implement the program. In addition to the usual materials for children, there are level-specific preparation programs for teachers. These include videotaped presentations.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Presentation of selected sets of materials to each child, without instructions of what to do.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Materials are science-related, may be organized by grade level, and are appropriate for a wide range of ability levels.

K. MATERIALS PRODUCED:
1. Classroom Kit of Materials for Level One.
2. 30 fifteen-minute videotaped presentations for children - Level One.
3. 22 thirty-minute videotaped presentations for teachers - Level One.
4. Mimeographed descriptions of various aspects of the project.
5. Guide for the CSLS Level One Teacher.
6. CSLS Level One - Program Guide for the Coordinator.

L. MATERIALS AVAILABLE FREE: Item 4, Mimeographed descriptions of project. Write: Director, CSLS.

M. MATERIALS PURCHASABLE: Classroom kits available only to tryout centers. Contact the CSLS Director for: Item 5, $4.00; Item 6, $4.00.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Program components for levels K and 2, comparable to those described for Level One.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: (Not available for adoption) 11 tryout teachers are using the materials.
2. Number of students involved: 300.
3. Number of schools involved: 7.
4. Total number of teachers using any of the materials: 32.
5. Total number of students using any of the materials: 900.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Florida State University School, Tallahassee, Florida; Florida A&M University School, Tallahassee, Florida; Alexander D. Henderson, School of Florida Atlantic University, Boca Raton, Florida; Selected schools in Montgomery Co., Md. (Contact John Pancella).

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: A complete teacher preparation program is available. Consultant services related to the program are available by members of the project staff.

2. Activities conducted for pre-service and in-service teacher training: Conference for Coordinators - $60.00 Registration & Expenses.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: CSLS Coordinator Guide - $4.00. CSLS Teacher Guide - $4.00. Videotaped Presentations for Teachers (Charge only for dubbing from master tape).

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies: See CSLS Level One - Program Guide for the Coordinator.

3. Brief abstract of in-house or unpublished research: (a) "CSLS-Level One Preliminary Report on the 1968-69 try-out" - this report focuses on the classroom conditions before and during the implementation of CSLS Level One in fifteen classrooms of the Atlanta (Ga.) Public Schools. (b) Development of the Science Curriculum Assessment System (SCAS) Part One: Introduction and interview protocols & Part Two: Classroom observational systems and conclusions. Dr. Charles Matthews & Dr. Darrell Phillips, authors. These reports describe the use of the Science Curriculum Assessment System in gathering data from 250 children and 27 teachers in grades K-6. They will be presented at the 1970 NARST meeting.

4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: Not answered.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Projected Schedule of CSLS Program Development (1969-1976)

YEAR	LEVEL BEING DESIGNED	LEVEL UNDER TRY-OUT FIRST	SECOND	OTHER ACTIVITIES
1969-70	K, 2	1		development of distribution techniques
1970-71	3	K, 2	1	revisions and longitudinal studies
1971-72	4	3	K, 2	revisions and longitudinal studies
1972-73	5	4	3	revisions and longitudinal studies
1973-74	6	5	4	revisions and longitudinal studies

YEAR	LEVEL BEING DESIGNED	LEVEL UNDER TRY-OUT FIRST	SECOND	OTHER ACTIVITIES
1974-75	?	6	5	revisions and longitudinal studies
1975-76	?		6	revisions and longitudinal studies

A. PROJECT TITLE: COLLEGE INTRODUCTORY PHYSICAL SCIENCE (CIPS).

B. PROJECT DIRECTOR: Dr. Uri Haber-Schaim, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160. (617)969-7100.

C. PROJECT HEADQUARTERS:
   1. Contact: Project director.
   2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: A number of people have worked on the project at various times. Acknowledgments are given in the textbook.

E. PROJECT SUPPORT:
   1. Organizational agency: Education Development Center.
   2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
   1. Principal originator: See acknowledgments in the textbook.
   2. Date and place of Initiation: 1968; Education Development Center.
   3. Overall project purpose: See H below.

G. PRESENT COMMERCIAL AFFILIATIONS: Prentice-Hall, Inc., College Division, Englewood Cliffs, N.J. 07632.

H. PROJECT OBJECTIVES: For a concise statement see the preface to the book. In broad terms it is an introductory course for general graduation requirements as well as future teachers with science specialties.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups, Pre- and post-lab discussions

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: College freshmen.

K. MATERIALS PRODUCED:
   1. Textbook.
   2. Instructor's Guide.
   3. Laboratory equipment and apparatus.
   4. Independent Study Kit.

L. MATERIALS AVAILABLE FREE: Item 2: with class adoption, from Prentice-Hall, Inc., College Division, Englewood Cliffs, N.J. 07632.

M. MATERIALS PURCHASABLE:

1. $6.50 from College Division, Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.
3. Prices vary; catalog can be obtained from College Division, Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.
4. $10.00 from College Division, Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Spanish, Portuguese.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Tests.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Not answered.
2. Number of students involved: About 2500.
3. Number of schools involved: About 20.
4. Total number of teachers using any of the materials: Unknown.
5. Total number of students using any of the materials: Unknown.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Not answered.

R. TEACHER PREPARATION: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated: Yes, by project staff.
2. Pertinent published research studies: Not answered.

T. PROJECT PUBLICITY: Not answered.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Not answered.

A. PROJECT TITLE: COMMITTEE ON LOW-ACHIEVERS IN MATHEMATICS - DENVER AREA.

B. PROJECT DIRECTOR: Mr. Terry Shoemaker, Project Director, Douglas County School District Re. 1, P.O. Box Q, Castle Rock, Colorado 80104.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Participating school visitation.

D. PRINCIPAL PROFESSIONAL STAFF: Mrs. Lucille Grogan, Consultant; Mr. Dan Colvin, Consultant.

E. PROJECT SUPPORT:
1. Organizational agency: Colorado Department of Education.
2. Funding agency: Colorado Department of Education.

F. PROJECT HISTORY:
1. Principal originators: Mr. Gene Panning, Director of Instruction; Mr. Terry Shoemaker, Project Director.
2. Date and place of Initiation: April 1968; Douglas County, Colorado.
3. Overall project purpose: Develop curriculum and teacher training activities for low achieving pupils, grades 7-12.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:
1. To enhance the mathematical performance of low achieving students without adversely affecting performance in other areas.
2. To effect more favorable teacher attitude toward mathematics and his/her mathematics class.
3. To effect more favorable teacher attitude toward teaching low achievers mathematics.
4. To have developed or selected materials and teaching aids that have been field tested.
5. To have collected data on mathematics skills necessary for everyday living and considered important job skills.

Unique emphasis of project:
1. Project emphasis on teacher training.
2. Twenty-three participating districts in cooperative effort.
3. Development of program to supplement existing local school district operation.
4. Creation and utilization of pupil performance objectives for low-achievers, grades 7-12.
5. Preparation of teacher "idea card" resource file.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Seminars, Discussion groups. Teacher diagnoses pupil computation deficiencies and identifies learning activities from cognitive performance objectives coded to teacher "idea card" file.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Low achieving pupils enrolled in grades 7-12.

K. MATERIALS PRODUCED:
1. Set of teacher instructional "idea cards".
2. Pupil materials (printed, manipulative, concrete, inquiry learning packets, games, etc.).
3. Cognitive performance objectives for pupils.
4. Cognitive and affective objectives for teacher training.
5. Project description brochure.
6. COLAMDA model design (including: rationales and designs for project operation; dissemination activities; evaluation activities; material production; sample instructional materials produced and cost lists).

L. MATERIALS AVAILABLE FREE: No. 5 - From Director.

M. MATERIALS PURCHASABLE: No. 6, $4.25 - From Director.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Unknown.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Pupil and teacher training objectives and instructional material for elementary grade levels.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: By September 1970 - 250 teachers.
2. Number of students involved: Approximately 12,000.
3. Number of schools involved: Approximately 200.
4. Total number of teachers using any of the materials: Unknown.
5. Total number of students using any of the materials: Unknown.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimates.
7. Name and location of selected schools where the course is being taught: Mapleton High School, Denver, Colorado; York Junior High School, Denver, Colorado; Highland High School, Denver, Colorado; Adams City Senior High School, Commerce City, Colorado; Vikan Junior High School, Brighton, Colorado; East Junior High School, Aurora, Colorado.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Assistance in staffing workshops based on COLAMDA design. Guidance and limited training for school administration and master teachers desiring COLAMDA model implementation, by arranging visitations to project schools, consultant services (on-site and via telephone), and limited summer workshop enrollment.

2. Activities conducted for pre-service and in-service teacher training:

(a) Two-day COLAMDA model introductory workshop - financed by local school district.

(b) Two-week summer continuum workshop - financed by USOE, NSF, CEA, local school districts at $120 and/or stipend per participant.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: See Item M.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff and Colorado Department of Education.

2. Pertinent published research studies: None.

3. Brief abstract of in-house or unpublished research: Being prepared.

4. Additional evaluative data available to interested individuals: Available June 1, 1970. Contact project office.

T. PROJECT PUBLICITY:

ASSM publications

Colorado Educator.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:

1. Teacher selection by participating districts.
2. Teacher in-service and workshop training.
3. Design and production of instructional material.
4. Field testing materials.
5. Preparation of cognitive and affective objectives for pupil instruction and teacher training.

V. PLANS FOR THE FUTURE:

1. 1970-71: Expansion within state of Colorado; material revision; research similar needs at elementary level.

2. 1971-72: Transfer project operation to local school district.

A. PROJECT TITLE: COMPREHENSIVE SCHOOL MATHEMATICS PROGRAM (CSMP).

B. PROJECT DIRECTOR: Burt Kaufman, Director, CEMREL-CSMP, 103 S. Washington Street, Carbondale, Illinois 62901. (618)549-5356.

C. PROJECT HEADQUARTERS:

1. Contact: Project director.

2. Special facilities or activities available for visitor viewing: Classes for secondary students in the "Elements of Mathematics" program; pilot test of CSMP activity packages in several Carbondale elementary schools; extensive display of EM texts and of individualized, multi-media learning packages; interview with staff and students; viewing of a 25-minute color film, "CSMP: Where Students and Mathematics Meet".

D. PRINCIPAL PROFESSIONAL STAFF: Assistant directors: Joseph Karmos, Dave Masters; mathematicians in residence: Arthur Engel, Ingo Weidig; Tony Pearce, administrative assistant; Fr. Larry Lorenzoni, SDB, senior editor, technical writer, public relations; teacher-writers (1969-70 staff): Diane Boesch, Lowell Carmony, Sr. Pamela Clarke, OP, Peter Drees (pilot study coordinator), Jerry Exum, Roy Hajek, Jim Harris (EM editor), Clare Heidema, Marvin Hinshaw, Ann Narel; pilot study teachers: Jane Besharse, Edwina Carter, Verline Davis (teacher aide), Pat Smith; media and design: Bob Hunter, Duncan Mitchell, Jim Nugent, Rebecca Baker, Carla Peyton; Lois Armetta, production; evaluation: Martin Herbert, Laura Hinshaw; systems analysts: Fred Matejcek, Judy Albers; Jan Kowal, librarian; library staff: Katie Fong, Ron Tinckham; secretaries: Jean Bandy, Teresa Lewis, Dorothy Novick, Mary Schuster, Loretta Scott, Susie Tebow. (As of this writing, the following will join the CSMP staff: Professor Vincent Haag as academic coordinator; Martin Caplan and Bob Hammond as teacher-writers)

E. PROJECT SUPPORT: Central Midwestern Regional Educational Laboratory, Inc., (CEMREL), 10646 St. Charles Rock Rd., St. Ann, Mo. 63074.

F. PROJECT HISTORY:

1. Principal originator: Burt Kaufman.

2. Date, place of origin, and brief history: September 1965, at Nova High School, Fort Lauderdale, Florida. The project was then called "The Nova Comprehensive Mathematics Project" (NCMP). In September 1966 it became a curriculum development project sponsored by Southern Illinois University and it was called "The SIU Comprehensive School Mathematics Project" (SIU-CSMP); in September 1967 CEMREL made CSMP one of its major programs under a joint co-sponsorship with SIU, and the official name "Comprehensive School Mathematics Program" was

adopted. In July 1969 CEMREL assumed complete responsibility for CSMP's funding. (CEMREL is one of 15 regional educational laboratories established in 1965 under Title IV of the Elementary and Secondary Education Act and funded by the USOE.)
3. Overall project purpose: The individualization of the K-12 mathematics curriculum in the spirit of the 1963 Cambridge Conference recommendations.

G. PRESENT COMMERCIAL AFFILIATIONS: None, except for two CSMP by-products, the "Operational Systems Games" by Kaufman and Steiner, McGraw-Hill, Inc., Webster Division, 1969, and a 5-film series "Mathematics for the Real World", COMMUNICO, St. Louis, 1970.

H. PROJECT OBJECTIVES: CSMP is organized within CEMREL to develop mathematics curricula for students of ages 5 through 18. Two interrelated mathematics programs are being developed: Activity Packages are being designed for independent student work using a variety of media, such as films, games, audio and video tapes, filmstrips and books; the Elements of Mathematics series, designed for well motivated junior and senior high school students with high verbal ability, is individualized in its presentation, but appears presently in textbook form. The CSMP curricula are being prepared to provide each student with a program that is sound in content, enjoyable, and appropriate to his needs and abilities. The program and the material are designed to help each individual achieve maximum success in realizing his potentials to learn and use mathematics. The developers of the program believe that, to realize its goals, CSMP must be discipline oriented. By this they mean that, while all pedagogical aspects of mathematics education are of deep concern, priority is given to the selection and development of a sound mathematical content. They do not want to do a superb job of teaching trivia. The implications are that the mathematical community must be deeply involved in the program, that mathematicians must be physically in residence, and that mathematicians must guide the program. Several groups and organizations have been set up within CSMP to guarantee that this will continue to be the case: (1) The National Advisory Committee; (2) The CSMP Staff Associates; (3) Consultants; (4) Annual International Conferences on the Teaching of Mathematics at the Pre-college Level.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Multi-media activities (using audio and video tapes, games, films and a great variety of manipulatives), Programmed instruction, Independent but supervised study, Lectures.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Third-grade activity packages are being pilot tested in ten Carbondale public school classrooms, at the University Laboratory School, and at Carr Lane School in St. Louis. Development of K-1 materials, through actual writers-student contact, is underway at the SIU Laboratory School (1970-71), with development of 2nd-grade materials to follow (1971-72) prior to pilot testing of same in 1971-72 and 1972-73, respectively. Fourth-grade materials are being prepared with a development group of students from the University Laboratory School (working from a content outline prepared by a staff associate, activity sequence outlines are prepared and prototype activities written and implemented through a 2-year period prior to pilot testing). These activity packages are designed for all students, covering a wide spectrum of abilities and individual differences. An ungraded program for highly verbal and well motivated students (grades 6 through 12) is also being offered at CSMP headquarters: some 120 students from the Carbondale public schools are bussed to the CSMP offices every day for their mathematics period. They study the books in the CSMP "Elements of Mathematics" series.

K. MATERIALS PRODUCED:

1. CSMP Basic Program Plan (this document makes explicit the factors which influenced the selection of the program, the expected outcomes, the strategy designed to achieve those outcomes, the program components, and plans through the next five years).
2. "The Elements of Mathematics Program" (an 8-page brochure, taken from the CSMP Basic Program Plan, describing the CSMP textbook series "Elements of Mathematics").
3. Book 0 (EM Series): Intuitive Background. The nine chapters of this 3-volume work cover the following topics: Operational Systems; The Integers; Sets, Subsets, Operations with Sets; Ordered Pairs, Generated Sets, Mappings; Rational Numbers; Geometry; Applications of the Rational Numbers; An Introduction to Number Theory; Probability and Statistics. Working from real situations and making wide use of tables, diagrams and graphs, Book 0 is designed to expose the students to a wealth of intuitive experiences with the notions of set, operational systems, relations, functions, etc., and to give sufficient practice in necessary arithmetical skills.
4. Book 1: Introductory Logic.
5. Book 2: Logic and Sets.
6. Book 3: Introduction to Field Theory.
7. Book 4: Order in Fields.
8. Book 5: An Introduction To Mathematization: A Theory of Voting Bodies.
9. Book 6: Relations.
10. Book 7: Functions.
11. Book 9: Finite Probability Spaces.
12. Book 11: Groups and Rings.

NOTE: Items listed under 4 through 12 (EM Series) are being taught only by CSMP-trained teachers. EM books listed under "purchasable materials" below are presently made available for examination only and should not be reproduced nor taught without the written permission of the CSMP director.

13. Activity packages designed for a wide spectrum of 3rd-grade students. These packages are described under P.
14. CSMP Brochure and CEMREL Newsletter.
15. CEMREL Annual Report.
16. CSMP - 1970 Overview.
17. International Conference on Probability Report.

L. MATERIALS AVAILABLE FREE:
1. CSMP Brochure.
2. Brief EM Program Description.
3. Brief Package Program Description.
4. CSMP - 1970 Overview.
5. CEMREL Annual Report.
6. CEMREL Newsletter.
7. Other materials (transcript of interview with CSMP director, copies of published articles, mimeographed background information) of current interest depending on availability of reprints.

Address requests to address as in B.

M. MATERIALS PURCHASABLE: No. 1 ($4.00), No. 2 ($1.00), No. 4 ($3.20, but see note under No. 12), No. 5 ($2.75, see note under No. 12), No. 8 ($1.75, see note under No. 12).

Persons interested in any of the material under K, even in its present incomplete form, may contact the CSMP director for information as to availability and cost of examination copies.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: It is anticipated that some of the EM material will be translated into German and Swedish.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. CSMP's main effort is directed toward the production of activity packages. Eleven 3rd-grade "packages", each comprising several activities using a variety of media, are presently (1969-70) being pilot-tested in four Carbondale 3rd grades, with valuable formative evaluation data being fed back into the materials themselves; the number of participating classes will increase to about a dozen (1970-71). The pilot-tested materials will then be used in wider field trials to obtain summative evaluation data and necessary statistical evidence prior to actual diffusion. The eleven packages are: Addition (23 activities); Motion Geometry I (7 activities);

Length I (6 activities); Introduction to Multiplication (33 activities); Names (3 activities); Number Line (3 activities); Probability (4 activities); Positional Notation (17 activities); Repeated Addition (7 activities); Residue Class Systems (17 activities); Subtraction (26 activities). Both package titles and number of activities will change in this essentially flexible and growing program. Packages are also being planned and developed (presently with a group of 4th graders) in the areas of graph, theory, rational numbers, measurement, operational systems, number theory, topology, space geometry, integers, relations and functions.

2. Book 8 (The Natural Numbers and Mathematical Induction) and Book 10 (Affine Geometry and the Real Numbers) are being written and edited, (1970) with Books 12, 13, 14, and 15 (Linear Algebra with Trigonometry, Introduction to Real Analysis I, Introduction to Real Analysis II, and Field Extensions and the Complex Numbers, respectively) to follow in 1971, 1972, and 1973.

3. "Mathematics for the Real World", a series of five 16mm color films that may be used to enrich high school or college mathematics classes have been produced by COMMUNICO in cooperation with CEMREL-CSMP. They feature Professor Joseph M. Gani, Director of the Sheffield-Manchester School of Probability and Statistics. COMMUNICO is a documentary and educational film producer in St. Louis. The film lectures cover the following topics:

Pure Mathematics. This involves mathematics of finance, including capital and interest, with a discussion of geometric series and the exponential function.

Applied Mathematics. This film deals with velocity and acceleration. The path of projectiles is used as an illustration.

Statistics. The axioms of probability are explored in this film as applied to today's world. It includes the binomial and Poisson distributions and applications.

Operations Research. This film is concerned with linear programming, the solutions of equations involving inequalities and practical examples.

Computing. The binary system with simple examples of numerical analysis and the uses of computers is the focus of this film.

4. The First International Conference on the teaching of probability and statistics to elementary and secondary students was held at Carbondale in March 1969, at which time more than 25 outstanding mathematicians from around the world read papers, delivered lectures and studied the Comprehensive School Mathematics Program. A report of that conference is being published in book form by Almqvist & Wiksell, Stockholm, Sweden, and is presently available. A report of the 1970 geometry conference will also be published (Spring 1971).

Q. PROJECT IMPLEMENTATION: In the present development and pilot-test stages of CSMP materials some 20 teachers are involved in teaching about 180 junior and senior students and some 350 3rd graders at the University Laboratory School, in four Carbondale public schools, and at Carr Lane School in St. Louis. The 20-teacher and the 180-student figures include three classes presently using EM textbooks, with CSMP-trained teachers, in Swiftwater, Penna., Wichita, Kansas, and New York, N.Y.; 120 students are bussed daily from various Carbondale schools to CSMP headquarters for their mathematics instruction.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using materials: CSMP staff members are available on call as consultants when needed.

2. Activities conducted for pre-service and in-service teacher training: In 1969, a 4-year NSF-CEMREL summer teacher institute was begun at Syracuse University to train teachers for the EM program. Members of this summer institute spend one of the four summers in Carbondale. The institute leads to an MS in mathematics granted by Syracuse University.
To accommodate a broader spectrum of interested teachers CSMP has planned a series of summer sessions to be held in Carbondale beginning this year (1970). Since CEMREL's present budget cannot cover such a program, individual participants will be supported by other agencies (Title III, Illinois Gifted Student Program, local school districts, etc.). In-service training for public elementary school teachers involved in CSMP pilot tests is carried out on a weekly basis in Carbondale. Short summer sessions for the same teachers have also been conducted in 1969 and are planned for the future.

S. PROJECT EVALUATION:

1. Third-grade activity package program was pilot tested on four local third grades in 1969-70. A larger trial of about a dozen third grades is being carried out in 1970-71 to answer a variety of experimental questions. Evaluation is primarily formative in nature, but at least two classes (with control groups) are carefully controlled to provide summative data. All evaluation is performed by the CERMEL evaluation staff. Data is collected from teacher and student attitude survey, participant observer techniques, standardized tests and criterion referenced tests written by the evaluation staff. Large scale field trials will be performed when a continuous K-6 program is available.

2. Pertinent Published Research studies: Research studies are carried out only insofar as they assist the development of the program (formative evaluation). A report of pilot trials of 1969-70 is available (October 1970).

3. Test items are written for each package and, upon their administration to the development group of students, a report is made to the writers for revision. This procedure is also

followed for all packages administered to students in pilot trials. From time to time small experimental questions are investigated regarding content, media, sequencing and classroom management. Where the questions have serious ramifications for the project, these questions are pursued in the pilot trials and reports made to the writing staff. None are published yet, but some are expected to be in 1971.

NOTE: Evaluation of the EM program will expand as materials become available in finished form and as pilot classes begin to use such finished materials. This evaluation will be primarily summative in nature.

4. Specific questions may be directed to Martin Herbert, CSMP.

T. PROJECT PUBLICITY:

1. Kaufman, Burt A. and Hans-Georg Steiner, "The CSMP Approach to a Content-oriented, Highly Individualized Mathematics Education", Educational Studies in Mathematics, Vol. 1, No. 3, January 1969, pp. 312-326.
2. Steiner, Hans-Georg and Burt A. Kaufman, "Checker Games in Operational Systems as Media for an Inductive Approach to Teaching Algebra", Educational Studies in Mathematics, Vol. 1, No. 4, March 1969, pp. 445-483.
3. Suydam, Marilyn N., "Continuing the Math Revolution", American Education, Vol. 6, No. 1, January-February 1970, pp. 26-30.
4. CSMP, "Relating Multiplication Facts to the Real World of Pupils", Croft Educational Services, Elementary School Edition (K-3), Third Quarter, 1969-70, pp. 5-7.
5. CSMP, "How Middle Graders Will Meet Probability in One New Program", Croft Educational Services, Elementary School Edition (4-6), Fourth Quarter, 1969-70.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:

1. As of July 1969 CSMP became completely a program within CEMREL.
2. A National Advisory Committee was formed (a meeting was held in Carbondale, Dec, 4-6, 1969). The members are: Max Beberman, University of Illinois; Robert Davis, Chairman, Syracuse University; William M. Fitzergerald, Michigan State University; Peter Hilton, Cornell University; Donald Kreider, Dartmouth University; Abraham Mark, Southern Illinois Univeristy; Gerald R. Rising, State University of New York at Buffalo; Myron Rosskopf, Columbia University Teachers College; Herbert E. Vaughan, University of Illinois; Hans Zassenhaus, Ohio State University.
3. The CSMP Staff Associates meet as a group on an average every two months with the CSMP staff. Individual staff associates spend more extended periods of time in residence at CSMP headquarters, especially during semester breaks and in the summer months. The CSMP Staff Associates are:

Peter Braunfeld, University of Illinois; Wilber E. Deskins, Michigan State University; Robert Exner, Syracuse University; Vincent Haag, Franklin and Marshall College; Eugene Krause, University of Michigan; Lennart Rade, Chalmers Institute of Technology, Gothenberg, Sweden; Merrill Shanks, Purdue University; Hans-Georg Steiner, University of Karlsruhe, Karlsruhe, West Germany; Nicholas Sterling, Jr., State University of New York at Binghamton; Robert Troyer, Lake Forest College.

4. The First CSMP International Conference (on the teaching of probability and statistics) was held in Carbondale in March 1969 and a report was published in book form by Almqvist & Wiksell, Stockholm, Sweden.
5. The Second CSMP International Conference (on the teaching of geometry) was held in Carbondale in March 1970.
6. A mathematics librarian was hired for the program's library.
7. The CSMP Basic Program Plan and Supplement was published.
8. Much of the material under K and P was developed and pilot tested.
9. Content outlines on various mathematical topics were prepared by the staff associates (The Integers, Graph Theory, Measurement, Topology, Transformation Geometry, Space Geometry, also a position paper on Algorithms.)
10. Activity sequence outlines were discussed and prepared by teacher-writers and staff associates.
11. A 25-minute color film "CSMP - Where Students and Mathematics Meet", was produced by the CEMREL staff and KETC-TV, St. Louis.
12. Five 16mm color films were produced by CEMREL-CSMP and COMMUNICO, St. Louis (see description under P).
13. A CEMREL-NSF-sponsored summer institute for teachers of EM materials was started.
14. Conducted a 2-year pilot trial of CSMP activity packages in about a dozen public school 3rd-grade classes.
15. CSMP summer sessions for a wider spectrum of EM teachers were begun.

V. PLANS FOR THE FUTURE: Development of Package Program, EM Program, and Film Series will continue. Contact director for a detailed flow chart.

A. PROJECT TITLE: A COMPUTER ASSISTED INSTRUCTION LABORATORY IN MATHEMATICS AND SCIENCE.

B. PROJECT DIRECTOR: Fred O'Neal, Project Director, 7618 Wyandotte, Room 214, Kansas City, Missouri 64114. (816)363-4482.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Computer-assisted instruction lab with demonstrations.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. Gordon E. Wesner, General Director; Tom Hartley, Asst. Project Director and Senior Teacher - Writer; Jack Raveill, Asst. Project Director and Senior Teacher - Writer; Evelyn Walton (Mrs.), Systems Manager; Ken Snyder, Programmer; Jim Mahr, Evaluator; and six teacher - writers.

E. PROJECT SUPPORT:
1. Organizational agency: Kansas City, Missouri Public Schools.
2. Funding agencies: U.S. Office of Education, Title III (ESEA).

F. PROJECT HISTORY:
1. Principal originators: Dept. of Instructional Services, Kansas City, Missouri Public Schools.
2. Date and place of Initiation: January, 1967; Kansas City, Missouri.
3. Overall project purpose: Demonstration and pilot project to test feasibility of public school computer-assisted instruction.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: To pilot computer assisted instruction activity for public schools; to demonstrate computer assisted instruction in working installation; to train staff; to develop procedures; to develop curriculum.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Computer assisted instruction.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Supplementary and enrichment in math-science; 8th grade, all ability levels.

K. MATERIALS PRODUCED: Lessons for use in computer-assisted instruction.

L. MATERIALS AVAILABLE FREE: All lessons.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: CW II - 1130 Assembler.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Terminal Report (in Spring, 1971).

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: Not applicable.
2. Number of students involved: 550/year.
3. Number of schools involved: 1.
4. Total number of teachers using any of the materials: Not applicable.
5. Total number of students using any of the materials: 550/year.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Bingham Junior High School, 7618 Wyandotte, Kansas City, Missouri 64114.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Not applicable.
2. Activities conducted for pre-service and in-service teacher training: Workshops as needed; hands-on experience.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished research: There is research on student attitudes towards computer assisted instruction, teacher attitudes towards computer assisted instruction, and effectiveness of math drills.
4. Additional evaluative data available to interested individuals: Available by request.

T. PROJECT PUBLICITY: Educational Technology, March, 1970; Newsletter, National Council of Teachers of Mathematics, Spring, 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: 68-69 - Began operation of lab (full scale); 69-70 - Continued operation of lab (full scale).

V. PLANS FOR THE FUTURE: Evaluation and Final Report - 1970.

A. PROJECT TITLE: COMPUTER-BASED MATHEMATICS INSTRUCTION AT THE STANFORD-BASED LABORATORY FOR LEARNING AND TEACHING.

B. PROJECT DIRECTOR: Professor Patrick Suppes, Institute for Mathematical Studies in the Social Sciences, Ventura Hall, Stanford University, Stanford, California 94305.
(415) 321-2300, Ext. 3111.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Tour of an elementary school.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. Max Jerman, Director of Curriculum Operations; Dr. Mona Morningstar, Director of Data Analysis; Mr. Martin Clinton, Systems Manager; Mr. John R. Ball, Systems Engineer; Mr. David Voorhees, Communications Engineer; Dr. Barbara Searle, Curriculum Development.

E. PROJECT SUPPORT:
1. Organizational agency: Stanford University.
2. Funding agencies: U.S. Office of Education and National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Professor Patrick Suppes and Professor Richard C. Atkinson.
2. Date and place of Initiation: Summer 1963; Stanford University.
3. Overall project purpose: To provide a controlled environment for psychological and pedagogical studies of learning.

G. PRESENT COMMERCIAL AFFILIATIONS: No direct commercial affiliations. Equipment being used has been purchased or leased from IBM, Philco, Westinghouse, and Digital Equipment Corporation.

H. PROJECT OBJECTIVES: To develop an operational drill-and-practice program in elementary-school mathematics, grades 1-6; to develop remedial work in basic mathematics for secondary-school students at the drill-and-practice level; to develop a tutorial program in mathematical logic and algebra, and to develop a drill-and-practice program in spelling. The objective of both laboratories is then to test and evaluate these programs in as quantitative and in as scientific a way as is possible with methods of quantitative data analysis and behavioral and psychological theory.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Computer assisted instruction.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Arithmetic, problem-solving; grades 1-6; all ability levels. Logic, algebra; elementary grades for high-ability students; college.

K. MATERIALS PRODUCED:
A large body of curriculum material encoded for use in computer systems.

L. MATERIALS AVAILABLE FREE: See Section T.

M. MATERIALS PURCHASABLE: Drill Books, $350, IMSSS, Ventura Hall, Stanford, California 94305; contain curriculum of a drill-and-practice arithmetic program which has been used.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Additional curriculum materials.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 140.
2. Number of students involved: 3,000.
3. Number of schools involved: 16.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: Brentwood School, Ravenswood School District, East Palo Alto, Calif.; Walter Hays School, Palo Alto, Calif.; Tennessee A & I, Nashville, Tennessee; Kendall School, Washington, D.C.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Staff available.
2. Activities conducted for pre-service and in-service teacher training: Pre-service and in-service workshops are conducted when needed, on an individual basis.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies:
Patrick Suppes and Mona Morningstar, "Computer-Assisted Instruction", Science, 166, 343-350, 1969.

3. Brief abstract of in-house or unpublished research: Not answered.

T. PROJECT PUBLICITY:

1. Jerman, M., and Suppes, P. "A workshop on computer-assisted instruction in elementary mathematics". The Arithmetic Teacher, 1969, 193-197.

2. Suppes, P. "Computer technology and the future of education." Phi Delta Kappan, 1968, 44, 420-423.

3. Suppes, P., Loftus, E.F., and Jerman, M. "Problem-solving on a computer-based teletype." Educational Studies in Mathematics, 1969, 2, 1-15.

4. Suppes, R., and Morningstar, M. "Computer-assisted instruction." Science, 1969, 166, 343-350.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE: Not answered.

A. PROJECT TITLE: COMPUTER ORIENTED EXPERIMENT IN SCIENCE TEACHING (PROJECT COEXIST).

B. PROJECT DIRECTOR: Professor Donald Kreider, Mathematics Department, Dartmouth College, Hanover, New Hampshire 03755. (603) 646-2415. Asst. Professor Arthur W. Luehrmann, Jr., Physics Department, Dartmouth College, Hanover, N.H. 03755. (603) 646-2976.

C. PROJECT HEADQUARTERS:

1. Contact: Mrs. Jean Danver, 315 A Wilder Hall, Dartmouth College, Hanover, N.H. 03755. (603) 646-3583; or Project COEXIST, Wilder Hall, Dartmouth College, Hanover, N.H. 03755.
2. Special facilities or activities available for visitor viewing: A room equipped with 20 33 ASR terminals and eight controller plotters. Occasional class lectures are very interesting.

D. PRINCIPAL PROFESSIONAL STAFF: Mrs. Jean Danver, Project Administrator; John W. Strohbehn, Asst. Prof. of Engineering; Stephen J. Garland, Asst. Prof. of Mathematics; John R. Merrill, Asst. Prof. of Physics; Elisha R. Huggins, Asst. Prof. of Physics.

E. PROJECT SUPPORT:

1. Organizational agency: Dartmouth College.
2. Funding agency: Office of Computing Activities, National Science Foundation.

F. PROJECT HISTORY:

1. Principal originators: Donald L. Kreider and Arthur W. Luehrmann.
2. Date and place of Initiation: October 1, 1969; Dartmouth.
3. Overall project purpose: To develop a new introductory sequence of calculus courses and, carefully coordinated with it, a new elementary physics sequence and a new introductory engineering course, all of which will rely on computer-based materials and an algorithmic approach as a motivation for and as a supplement to classical analytical methods.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: The project objectives are stated in the Project Proposal to the NSF.

1. Produce reliable computer-based course materials for introductory sequences in mathematics, physics, and engineering. These will include text supplements, homework and lab exercises and classroom demonstrations.
2. The core of the material will be written in a computer-language independent fashion.
3. Supplementary language-dependent material will be written for users of BASIC.

4. Efforts will be made to adapt the materials to the new generation of small, inexpensive time-shared computers and to programmable desk-top calculators. (Dartmouth has a GE-635 Time Sharing System)
5. Establish a computer laboratory with a complex of inexpensive terminals and plotting equipment where students in the courses have ample opportunity to execute their own programs.
6. Efforts will be made to find the most economical means of implementing the courses and distributing the materials to the public.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Use of written materials in the form of homework exercises, writing computer programs and projects.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Dartmouth College freshmen enrolled in:
  Physics 3, 4 (physics for non-science majors).
  Physics 13, 14 (Introductory physics).
  Math 3, 4 (freshman calculus).
Dartmouth College sophomores enrolled in:
  Engineering Science 22 (introductory engineering).
  Sophomore level mathematics courses.
Other higher level mathematics and physics courses will be included from time to time. Dartmouth College students have an average higher ability than the average college student of the same year level.

K. MATERIALS PRODUCED:
  Project Proposal.

L. MATERIALS AVAILABLE FREE: None, at present.

M. MATERIALS PURCHASABLE: Project Proposal. $.25, from: Project COEXIST, Wilder Hall, Dartmouth College, Hanover, N.H. 03755.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
1. Mathematics:
  1st year
  - (a) Set of computer-based exercises and classroom demonstrations in calculus.
  - (b) Supplementary text materials in calculus.

  2nd year
  - (c) Items a and b, above repeated for sophomore mathematics in units of:

logic, probability, linear algebra, differential equations, orthogonal bases & Fourier series, boundary value problems, statistics.

2. Physics:

   Written first year and revised second year.

   (d) Computer language independent text supplements with reference to the three physics textbooks entitled, Physics 1 by E.R. Huggins, University Physics by Sears and Zemansky and Physics by Halliday & Resnick.

   (e) Computer based exercises and problems in physics.

   (f) Computer-based lecture demonstrations for physics.

   (g) Set of physics laboratory experiments.

3. Engineering:

   Written first year and revised second year.

   (h) Textbook for Unified System Theory course (ES-22).

   (i) Supplementary computer materials for introductory engineering courses primarily in circuit theory.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Not applicable, in development stages.
2. Number of students involved: 350.
3. Number of schools involved: Dartmouth College, at present. May expand to more next year.
4. Total number of teachers using any of the materials: 6.
5. Total number of students using any of the materials: 350.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Definitive.
7. Name and location of selected schools where the course is being taught: Not applicable.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: None, at present.
2. Activities conducted for pre-service and in-service teacher training: None, at present.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None, at present.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? No.
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished materials:

   Mathematics:

   (a) Set of computer-based exercises for Math 3.

   (b) Partial set of computer-based exercises for Math 4.

   (c) Research on validity of the contents of freshman calculus to the sciences and socials sciences.

Physics:
(a) Set of computer notes for Physics 3 and 13.

General:
(a) Notebook on how to operate the teletype and plotting equipment.
(b) Paper on "How to Write a Plotter Program in Dartmouth BASIC"

Engineering:
(a) First draft of textbook for Unified System Theory course.

4. Additional evaluative data available to interested individuals: No.

T. PROJECT PUBLICITY: Not answered.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

1. Spring 1970:
   - (a) Development of Physics 14 and Physics 4 materials.
   - (b) 1st use of Unified System Theory text in ES-22.
2. Summer 1970:
   - (a) Evaluation and rewriting of Math 3, Math 4, Physics 3, Physics 4, Physics 13 and Physics 14 materials and System Theory text.
   - (b) Writing of first drafts of the sophomore mathematics supplements.
3. Fall 1970:
   - (a) Throughout the school year 1970-71 the previously developed computer programs and the newly developed programs will be programmed also for small computers utilizing the BASIC language and, as much as possible, on a desk top computer.
   - (b) Development of the Physics 1 materials.
   - (c) Expansion of the use of Math 3 materials to most calculus sections.
   - (d) Use of part of the sophomore mathematics supplements.
4. Winter 1970:
   - (a) Evaluation and final rewrite of Math 3 materials and part of the sophomore math materials.
   - (b) Second use of Math 4, Physics 3 and Physics 13 materials.
   - (c) Final determination of changes to be made in Engineering Science 22 and writing of supplementary computer materials.
   - (d) First use of part of sophomore math materials.
5. Spring 1971:
   - (a) Evaluation and final rewrite of Physics 1, Physics 3, Physics 13 and Math 4 materials.
   - (b) Second use of Physics 14 and Physics 4 materials.
   - (c) Teaching of revised ES-22 course.

    - (d) First use of remainder of sophomore mathematics computer supplements.
6. Summer 1971:
    - (a) Evaluation and final rewrite of Physics 4 and 14, ES-22 and sophomore mathematics materials.
    - (b) Publication of all materials for distribution to the public.

A. PROJECT TITLE: CONCEPTUALLY ORIENTED PROGRAM IN ELEMENTARY SCIENCE (COPES).

B. PROJECT DIRECTOR: Professor Morris H. Shamos, Physics, New York University, 4 Washington Place, Room 503, New York, New York 10003. (212)598-3735.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Laboratory school, when in session.

D. PRINCIPAL PROFESSIONAL STAFF: Morris H. Shamos, Director; J. Darrell Barnard, Associate Director; Janice A. Cutler, Assistant Director; Carol Dempster, organic chemist; Katherine E. Hill, elementary science evaluation specialist; Philip Merrifield, educational psychologist; Joseph H. Rubinstein, biologist; Carol Samsky, evaluation assistant; Abigail B. Sher, evaluation specialist; Alvin Hertzberg, elementary school principal and science specialist; Denver Ulery, physics teacher; Stanley Simmons, science specialist, and Marilyn Rothenberg, elementary school teacher.

E. PROJECT SUPPORT:
1. Organizational agency: New York University.
2. Funding agency: U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal originators: Morris H. Shamos and J. Darrell Barnard.
2. Date and place of Initiation: September 1965; New York University.
3. Overall project purpose: To develop a K-6 science curriculum based on the conceptual schemes approach.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: To develop an elementary science curriculum based upon selected "great ideas" or conceptual schemes in science. The ultimate goal is to help develop a scientific literacy--by developing an understanding of the nature of matter (both animate and inanimate) in terms of a few basic conceptual schemes. Each concept, each conceptual scheme, is presented in a K-6 structured learning sequence with the purpose of contributing to this understanding. The concepts are organized in a hierarchy which is both scientifically and pedogogically logical. The order of the sequence will be in the form of a "spiral" development.

The five conceptual schemes selected to form the core of the COPES curriculum are (in hierarchical order): 1) The Structural Units of the Universe; 2) Interaction and Change;

3) Conservation of Energy; 4) Degradation of Energy; and 5) The Statistical View of Nature (or Order from Disorder). All five schemes are being developed concurrently.

The K-2 portion of the curriculum comprises those manipulative and conceptual skills which lay a foundation for the main portions of the five conceptual skills which effectively should start at Grade 3. Here too, the sequence of the K-2 program will be in the form of a "spiral" development linking its major content sections.

The COPES curriculum is action-centered. Almost all activities require exploration of a nonreading nature to be carried out by individual or small groups of students. It is also a fundamental principle of COPES that as the major and supporting science concepts are being developed within the structured sequences, basic skills, where appropriate to the teaching materials, must be concurrently developed and refined. The learning, understanding, and appreciation of science cannot procede properly without these basic skills (or processes of science). Thus the skills which are developed throughout the program, within its conceptual framework, are: analyzing, classifying, communicating, experimenting, interpreting, mathematical reasoning, measuring, observing and predicting. Although the materials are designed to involve children in various methods of investigation, the primary objective is an understanding of basic concepts.

It is expected that COPES will form the major (about 80%) portion of an elementary science curriculum - the remainder being devoted to applications or projects of the individual school's or teacher's choosing. The philosophy of the COPES program can be found in its descriptive Brochure (March, 1969 or November, 1969).

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, Teacher directed discussion and interpretation.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: All areas of science developed for K-6, (ages 5-12); although it has been used and is usable through grade 16. Evidence so far is that it is suitable for all ability levels.

K. MATERIALS PRODUCED:

1. Newsletter No. 1 (out of print).
2. Newsletter No. 2 (out of print).
3. Newsletter No. 3.
4. Newsletter No. 4.
5. A Pilot Project to develop an elementary science sequence, August 1, 1967 (available only from U.S. Office of Education).
6. Descriptive Brochures - October, 1966; March, 1969; November, 1969.

7. Teacher's Guide for a Conservation of Energy Sequence.
8. Water-Mix Experiments (pamphlet) to be issued Spring, 1970.

L. MATERIALS AVAILABLE FREE:
Items 3 and 4 available from COPES Project, New York University
4 Washington Place, Room 503, New York, N.Y. 10003.
Item 6 - November 1969 only - available from COPES Project.

M. MATERIALS PURCHASABLE:
Item 7 - Cost $5.00 plus .35 postage. From: Center for Field Research and School Services, New York University, 32 Washington Place, Room 51, New York, N.Y. 1003.

Item 8 - Contact COPES Project for cost and availability.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED:
None contemplated.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
1. K-2 volume of pre-sequence activities supportive of all five conceptual schemes.
2. Sequences are being completed for all five conceptual schemes.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: Entire course not ready. Estimated more than 100 teachers using what has been produced.
2. Number of students involved: More than 3,000.
3. Number of schools involved: Over 50.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: In Nassau County, N.Y.: Bloomingdale, Bethpage; Locust Valley Intermediate, Locust Valley; Baldwin Drive, Plainedge; Theodore Roosevelt, Oyster Bay; Joyce Road, Plainview; Mannetto, Plainview; Old Bethpage, Plainview; Sea Cliff Elementary, Sea Cliff; Village, Syosset; Dryden Street, Westbury.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: We provide intermittent consultative service to schools within commuting distance of New York City.
2. Activities conducted for pre-service and in-service teacher training: We have done a full year in-service course and a number of short-term workshops in various parts of the country; financed by the Project or the requesting agency.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: Morris H. Shamos and J. Darrell Barnard. A Pilot Project to Develop an Elementary Science Sequence, U.S. Office of Education Project No. H-281 (N.Y., New York University, 1967)
3. Brief abstract of in-house or unpublished research:

(a) Woodruff* assessed children's concepts by an oral interview technique and compared them with the assessment of the same concepts by the COPES Test of Science Concepts. This was done after the children had been taught the lower levels of the conservation of energy sequence. He found that in many instances children could explain concepts which the results of the written tests indicated they did not possess. Children often found the vocabulary and sentence structure of the written tests to be too complex even though all tests items had previously been tried out with children and revised before they were used in the pilot study. Woodruff's study has resulted in a revision of our approach to the assessment of concepts in the COPES curriculum.

*Woodruff, Bobby J. "The Assessment of Certain Concepts Held by Selected Children Using Individual Interviews and the COPES Test of Science Concepts", unpublished doctoral thesis, New York University, 1969.

(b) Shah* found in his study of the COPES Tests used in the pilot study dealing with the conservation of energy that: 1) items discriminated better than by chance, 2) items could not be demonstrated to constitute a scale, such as a Guttman Scale. 3) Criterion-related validity of the tests can be demonstrated. 4) The higher the concept in the hierarchy of science concepts in the conceptual scheme under investigation, which an item in the COPES Test of Science Concepts is intended to measure or represent, the more difficult, on the average, the item will tend to be.

*Shah, Rashid Ahmed. "The Structure and the Criterion-related Validity of the COPES Test of Critical Terms and the COPES Test of Science Concepts", doctoral thesis, New York University, 1969. (Unpublished).

T. PROJECT PUBLICITY:

1. Anon., "Scientific Literacy: The COPES Approach", The Indicator, ("Chemical Education Today"), New York and North Jersey American Chemical Society News, L: No. 1, January, 1969, pp. 26, 28-30.

2. Blough, Glenn O. and Schwartz, Julius, Elementary School Science and How To Teach It, Holt, Rinehart and Winston, Inc. New York, Fourth Edition, 1969, p. 555, p. 796, appendix.
3. Cutler, Janice A., "Background of the COPES Project", Project Report: Conceptual Schemes in Science: A Basis for Curriculum Development, Charles R. Botticelli, Project Director, National Science Teachers Association, Washington, D.C., pp. 38-43, 1968.
4. Cutler, Janice A., "Heat and Temperature", Science and Children, Vol. 3, No. 3, pp. 36-42, November, 1968.
5. Hill, Katherine E., "Science in the Elementary School: A Look Ahead", Science and Children, Vol. 6, No. 5, NSTA, Silver Review, Jan-Feb., 1969.
6. Hurd, Paul D. and Gallagher, James, "Conceptually Oriented Program in Elementary Science", New Directions in Elementary Science Teaching, Belmont, California: Wadsworth Publishing Co., Inc., 1968, pp. 52-57.
7. Shamos, Morris H., "The Role of Major Conceptual Schemes in Science Education", The Science Teacher, XXXIII: No. 1, January, 1966.
8. Victor, Edward, "Controversial Aspects of the Elementary Science Curriculum Projects", Science and Children, Volume 5, No. 2, pp. 27-31, October, 1967.
9. Victor, Edward, Science for the Elementary School, New York: The Macmillan Co., Second Edition, 1970, pp 7, 69, 207-210.
10. Wailes, James R., "Elementary School Science Experimental Projects", University of Colorado, Boulder, Colorado. Revised August, 1969, pp. 6, 7.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: The five conceptual schemes for the program were identified. Definitive activities and tentative sequences developed for "The Statistical View of Nature" and "The Structural Units of the Universe". Work started on the sequence for Interaction and Change. Major and supporting concepts to be covered in K-2 "pre-sequence" area were established. Skills to be developed throughout K-6 program were identified. New assessment approach designed. Pilot testing started.

V. PLANS FOR THE FUTURE: Sequences of definitive activities for the last two conceptual schemes, Interaction and Change and Degradation of Energy, should be completed by the end of the summer of 1970. Again, a summer laboratory school will be used for the development. Although at the end of the pilot phase a Teacher's Guide covering all K-6 activites for the scheme, Conservation of Energy, was published, we do not contemplate issuing K-6 volumes for the other four schemes. Instead, we plan to issue three volumes: K-2, 3-4, and 5-6. The last two volumes will contain sequences for each of the five schemes designed for a given grade level; logical bridging activities will provide a fully integrated, coherent, and sequential curriculum. The K-2 volume containing the activities that develop manipulative and conceptual skills required for all the schemes is being prepared now for release by September 1970.

A. PROJECT TITLE: COOPERATIVE GENERAL SCIENCE PROJECT. (CGSP)

B. PROJECT DIRECTOR: Dr. O.P. Puri, Director of CGSP, Chairman, Department of Physics, Clark College, Atlanta, Georgia 30314. (404)523-3538, 524-1210.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Classroom activities, laboratories, educational materials developed by CGSP, and audio-visual aids.

D. PRINCIPAL PROFESSIONAL STAFF: Not answered.

E. PROJECT SUPPORT:
1. Organizational agencies: Clark College in collaboration with several other colleges.
2. Funding agencies: U.S. Office of Education; Westinghouse; Dreyfus Foundation.

F. PROJECT HISTORY:
1. Principal originator: Dr. O.P. Puri.
2. Date and place of Initiation: July 1966; Clark College, Atlanta.
3. Overall project purpose: To develop a science curriculum for non-science majors.

G. PRESENT COMMERCIAL AFFILIATIONS: Addison-Wesley Publishing Company (Under negotiation).

H. PROJECT OBJECTIVES: We concentrate on historical, conceptual, philosophical, and humanistic aspects of science at the college level. No such project or projects exist as far as we know. We make our materials relevant to the needs of the students in adjusting to an ever-changing society.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups, Audio-visual aids (film loops, transparencies, films).

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Physical science - college freshman level; biological science - college freshman level.

K. MATERIALS PRODUCED:
1. Physical Science Text.
2. Physical Science Laboratory Manual.
3. Biological Science Laboratory Manual.
4. Progress Report.
5. Brochure.
6. Newsletters.

L. MATERIALS AVAILABLE FREE: Items 4, 5, and 6, from director.

M. MATERIALS PURCHASABLE: Items 1, 2, and 3. Presently under negotiation for commercial publication by Addison-Wesley. A limited number of Experimental Versions available from director.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Will be translated into several languages.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
1. Audio-Visual Materials.
2. Biological Science Text.
3. Teacher's Guides.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 12.
2. Number of students involved: 2500 students per year (1969-70).
3. Number of schools involved: Five (1969-70).
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: Clark, Morehouse, Morris Brown, and Spelman Colleges in Atlanta, Georgia. University of Tampa at Tampa, Florida.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Institutes; visitation.
2. Activities conducted for pre-service and in-service teacher training: We are projecting summer workshops which will be financed by non-federal foundations.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Teacher's Guides (Cost not available).

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff, publishers and University of Tampa.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: Contained in Progress Report available from director.
4. Additional evaluative data available to interested individuals: New Progress Report will be available shortly.

T. PROJECT PUBLICITY:
UNESCO (Bulgaria Meeting), APS, AAPT, AAAS, NSTA, NARST, and several others.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Commercially available text and laboratory manual and Teacher's Guide in Physical Science is expected to be ready by September 1970. Materials in Biological Science are expected to be commercially available by spring of 1971.

A. PROJECT TITLE: DEMONSTRATION AND EXPERIMENTATION IN COMPUTER TRAINING AND USE IN SECONDARY SCHOOLS.

B. PROJECT DIRECTOR: Thomas E. Kurtz, Director, Kiewit Computation Center, Dartmouth College, Hanover, N. H. 03755.

C. PROJECT HEADQUARTERS:
  1. Contact: John Nevison, Kiewit Computation Center.
  2. Special facilities or activities available for visitor viewing: Computation Center.

D. PRINCIPAL PROFESSIONAL STAFF: John Nevison, Project coordinator.

E. PROJECT SUPPORT:
  1. Organizational agencies: Not answered.
  2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
  1. Principal originator: Thomas E. Kurtz.
  2. Date and place of initiation: June 1967; Dartmouth College.
  3. Overall project purpose: Demonstrate that a computer can be used in a wide variety of ways in school.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Explore where computers can be used in class. Demonstrate that a computer can serve as a creative outlet for students.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Math and science, 7 - 12; social science, languages, history, 9 - 12.

K. MATERIALS PRODUCED:
  1. Four Classes with Fourth Graders--Introduction to BASIC, Grade 4, William A. Smith, Lebanon High School.
  2. A BASIC Manual for High School Students (with exercises), Grade 7 - 12, Floyd McPheters, Hartford High School.
  3. Junior High School Uses of a Time-shared Computer, Grade 7 - 9, G. Ralph Holden, Cape Elizabeth High School.
  4. Some Computer Applications in Secondary School Science, Grade 7 - 12, Spencer Laramie, Mascoma Valley Regional High School.
  5. Two Examples of Linear Programming in an Algebra I Class, Grade 9, William Smith and David Penner, Lebanon High School and Phillips Andover Academy.
  6. Solution of Simultaneous Linear Equations, Grade 9, John Connover, St. Johnsbury Academy.

7. BASIC in 10 Minutes a Day, Grade 9, Louis Hoitsma, Phillips Andover Academy.
8. Introduction of the BASIC Language, Teletype Usage and Elementary Programming, Grade 9, Peyton Pitney, Mount Hermon School.
9. Ninth Grade Word Problems, Grade 9, Warren Hulzer, St. Paul's School.
10. Random Sample Studies, Grade 9 - 10, Charles A. Tousley, Keene High School.
11. The Binomial Theorem, Grade 10, Gary Toothaker, Vermont Academy.
12. Genetics of the Fruitfly--Phenotype Ratios, Grade 10, Charles A. Tousley, Keene High School.
13. The General Solutions of the Quadratic Equations, Grade 10, G. Ralph Bolduc, Cape Elizabeth High School.
14. Value of "Cos t1" (an iterative technique), Grade 10 - 11, John C. Warren, Phillips Exeter Academy.
15. The Circular Function, Grade 10 - 11, John C. Warren, Phillips Exeter Academy.
16. The Use of the Computer in Air Pollution Study, Grade 10, 12, John Connover, St. Johnsbury Academy.
17. Summer School Computer Course, Grade 10 - 11, John Hauber, Loomis School.
18. Slope of a Line and Common Solutions for Systems of Linear Equations, Grade 10 - 11, G. Ralph Bolduc, Cape Elizabeth High School.
19. Areas and Perimeters of Circles and Ellipses, Grade 11, Paul Kenison, Manchester Central High School.
20. Slopes of Exponential Functions, Grade 11, George H. Lewis, Concord High School.
21. Five Ionization Reaction Problems, Grade 11, Spencer Laramie, Mascoma Valley Regional High School.
22. Area Under Trapezoid, Grade 11, Charles A. Tousley, Keene High School.
23. Introduction to Logarithms, Grade 11, Charles A. Tousley, Keene High School.
24. Finding Nth Degree Equations from a Set of Tabular Values, Grade 11, Paul E. Kenison, Manchester Central High School.
25. Finding Approximations for Irrational Zeros of Polynomial Functions, Grade 11 - 12, Peyton Pitney, Mount Hermon School.
26. Three Simple Examples of Computer Use in a Physics Laboratory, Grade 11 - 12, John Martin, Rutland High School.
27. Using a Time-shared Computer in Developing the Law of Sines, the Law of Cosines, and the "Solution of Triangles", Grade 12, Floyd McPhetres, Hartford High School.
28. Free Falling Bodies and Projectile Motion, Grade 12, Spencer Laramie, Mascoma Valley Regional High School.
29. Computer Course for Business Students, Grade 12, Ann Waterhouse, South Portland High School.
30. An Adult Education Course in BASIC Programming, Grade --, John Martin, Rutland High School.

31. Collected Uses of a Computer in Probability and Statistics Grade 8 - 12, Mary Hutchins, Hanover High School.
32. Two Programs on Riemann Sums, Grade 12, George R. Smith, St. Paul's School.
33. Numerical Integration, Grade 12, G. Albert Higgins, Jr., Mount Hermon School.
34. A Unit in Matrix Algebra, Grade 11 - 12, Ann Waterhouse, South Portland High School.
35. Interim Report - October 1968.

L. MATERIALS AVAILABLE FREE: Items 1 - 35.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Interim Report II; Textbook of Elementary Functions.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: Not answered.
2. Number of students involved: 3,600 - 4,000.
3. Number of schools involved: 18.
4. Total number of teachers using any of the materials: 120.
5. Total number of students using any of the materials: 3,600 - 4,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: South Portland High School, South Portland, Maine; Phillips Exeter Academy, Exeter, New Hampshire.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Kiewit Staff - Finances, operations, course material.
2. Activities conducted for pre-service and in-service teacher training: Two week summer training sessions ($100). Saturday teachers conferences.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Topic outlines.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: Not answered.

3. Brief abstract of in-house or unpublished research: Not answered.

4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: J. H. Danver and J. M. Nevison, "Secondary School Use of the Time Shared Computer at Dartmouth College", *Proceedings of Spring Joint Computer Conference*.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE: Final Report; trial of textbook 1970 - 71.

A. PROJECT TITLE: A DEMONSTRATION OF AN IMPROVED SCIENCE PROGRAM FOR UNDERACHIEVING STUDENTS (DISCUS).

B. PROJECT DIRECTOR: Mr. Robert Cronin, Director DISCUS Project, Duval County School Board, 1011 Gilmore Street, Jacksonville, Florida 32204. (904)355-8871.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Headquarters office, text materials, and laboratory materials.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. Larry Paulk, Supervisor, DISCUS Project; Mr. Nolan Gilmore, Supervisor, DISCUS Project; Dr. N. Eldred Bingham, Professor of Science Education, University of Florida - Consultant and Researcher on Project.

E. PROJECT SUPPORT:
1. Organizational agencies: Duval County School Board; Federal Projects - Title I; Cooperative College - School Science Improvement Project.
2. Funding agencies: Duval County School Board; Department of Health, Education and Welfare - Title I; National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: N.E. Bingham, C. Hines Cronin, and C. Robert Cronin.
2. Date and place of Initiation: Pilot Project in spring 1967, entitled "Teaching Science to Educationally Disadvantaged Youth," and supported by the Southeastern Education Laboratory, at Jacksonville, Florida.
3. Overall project purpose: To improve the attitude of junior high school science students toward themselves, their peers, their teachers and their schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Emphasis is upon a success-oriented science program in which educationally disadvantaged underachieving students learn science by participating in small group laboratory activities using a directed discovery approach.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, Presentation of activity via overhead projector and by reading with class student activity sheets, Following laboratory activity, discussion of results with data from student groups used in developing concepts.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Junior high school science students; ability in upper portion of below average students. Most of students will have an I.Q. in the nineties.

K. MATERIALS PRODUCED:

1. Handbook entitled "Teaching Science To Educationally Disadvantaged Youth". Published by Southeastern Education Laboratory, Inc. Now out of print. 1967.
2. DISCUS Seventh Grade - Life Sciences, 1968 - Out of print.
3. DISCUS Eighth Grade - Physical Sciences, 1968 - Out of print.
4. DISCUS Ninth Grade - Earth Sciences, 1968 - Out of print.
5. DISCUS Seventh Grade - Life Sciences. Revised 1970.
6. DISCUS Eighth Grade - Physical Sciences. Revised 1970 (not available until August 1970)
7. DISCUS Ninth Grade - Earth Sciences. Revised 1970 (not available until August 1970)

L. MATERIALS AVAILABLE FREE: None at the moment. All available supplies are exhausted.

M. MATERIALS PURCHASABLE: Items 5, 6 and 7 will be available and the expected cost is $1.00 each.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: No plans yet.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Laboratory materials have been furnished to schools - not available for distribution.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course? 35, expect 60 to use it next year as teachers of control groups are eager for it.
2. Number of students involved: 2,500.
3. Number of schools involved: 30.
4. Total number of teachers using any of the materials: 17.
5. Total number of students using any of the materials: 2500.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Definitive.
7. Name and location of selected schools where the course is being taught: Ribault Junior High School No. 212, Northwestern No. 155, Southside No. 211, Eugene J. Butler, in Jacksonville.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Cooperative College-School Science Improvement Program, 1969-70, NSF. Cooperative College-School Science Improvement Program, 1979-71, NSF. The above program has furnished the teachers of the DISCUS Program Summer Institutes on the University of Florida Campus, and consultative services of the Director, N.E. Bingham, and other University Faculty. The County School System has backed the project with a staff of three people - a Project Director and two supervisors.
2. Activities conducted for pre-service and in-service teacher training: In the beginning, extension classes from the University of Florida. Summer 1969: CCSS Institute on University of Florida Campus. Academic year 1969-70, two in-service courses in Jacksonville taught by Director of CCSS Program and by staff of DISCUS Project. Summer of 1970: CCSS Institute on University of Florida Campus. Academic year: consultative services of CCSS Program director and DISCUS project staff.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: The DISCUS Manuals for the seventh, eighth and ninth grades.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by an outside agency.
2. Pertinent published research studies:
   (a) Bingham, N.E., "A Demonstration of the Role of Science in the Programs of Educationally Deprived Children in Grades 7 - 9". Science Education, Vol. 52, No. 3, April 1968.
   (b) Bingham, N.E., and Hines Cronin, "A Success-Oriented Program for the Educationally Deprived", The Science Teacher, Vol. 35, No. 8, November 1968.
   (c) To be published in June issue of School Science and Mathematics - Bingham, N. Eldred, C. Robert Cronin, and Larry Paulk, "DISCUS: A Demonstration of an Improved Science Curriculum for Underachieving Students". (A Paper presented at the NARST Annual Convention in Pasedena, California (2/6 - 9/1969)

It was found in the above study and in the progress report presented in Minneapolis in 1970 at the NARST Annual Meeting that,if you segregate educationally deprived underachieving youth and place them in a success-oriented program, they do improve in their attitude toward themselves, their teachers and their school and that they become less oriented toward their peers. The teachers of the DISCUS program who have been in the CCSS-NSF supported program do, in fact, operate a more democratic classroom, they use less lecture and more concrete and representative means of provoking images than the control teachers, and they have their students spend much more time in meaningful small group laboratory activities.

This progress report may be obtained by writing to Dr. N.E. Bingham, University of Florida, Gainesville, Florida 32601.

T. PROJECT PUBLICITY:
Mentioned above.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE:
Will integrate the program into the regular school program as of this coming academic year. Will temporarily phase out the development of materials and the special training programs for the training of teachers.

A. PROJECT TITLE: THE DEVELOPMENT AND IMPLEMENTATION OF A FOUR-YEAR, UNIFIED, CONCEPT-CENTERED SCIENCE CURRICULUM FOR SECONDARY SCHOOLS.

B. PROJECT DIRECTOR: Carl H. Pfeiffer, Science Department Chairman, Monona Grove High School, 4400 Monona Drive, Monona, Wis. 53716 (608)222-1291.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: The physical facilities at Monona Grove High School have been modified to accommodate the team teaching of unified science.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. Samuel Bale, Miss Rosemary Ehl, Miss Marianne Kratowicz, Mr. Theodore Lippold, Mr. Carl H. Pfeiffer, Mrs. Marie Wartolec, Mr. William Ziegler.

E. PROJECT SUPPORT:
1. Organizational agencies: None.
2. Funding agencies: U.S. Office of Education; partial support (1966-69). Local School District.

F. PROJECT HISTORY:
1. Principal originator: Mr. Carl H. Pfeiffer.
2. Date and place of Initiation: September 1964; Monona Grove High School.
3. Overall project purpose: To develop and implement a unified concept-centered science curriculum to replace all subject oriented science courses at Monona Grove High School.

G. PRESENT COMMERCIAL AFFILIATIONS: None. This program was developed to fill a specific need at Monona Grove and was not intended for general adoption.

H. PROJECT OBJECTIVES: The 4-year, unified, concept-centered science program was developed by the science staff at Monona Grove High School in the belief that this approach represents a more effective means of realising the educational objectives established for the science program at this high school than possible through a subject-oriented program. Since September 1967 all science taught at Monona Grove High School has been part of the unified program.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, Laboratory investigations, Lectures, Seminars. Resource Center programs.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science IA and IB - 9th grade; Science IIA and IIB - 10th grade; Science IVA - 12th grade.

K. MATERIALS PRODUCED:

1. "The Role of the Resource Center in the Education Program."
2. "The Monona Grove Four Year Unified Science Program"
3. "Comprehensive Evaluation of the First Five Years Experience with the Unified Science Program at Monona Grove."
4. Student Course Books for all Science Programs (IA, IB, IIA, IIB, IIIA, IIIB, IVA).
5. Teacher Handbooks of Concept Organization for all Science Programs.

L. MATERIALS AVAILABLE FREE: Item 1, Item 2; Carl H. Pfeiffer, Science Dept. Chairman, Monona Grove High School, 4400 Monona Drive, Monona, Wisconsin 53716.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Resource Center Programs.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Course is used only at Monona Grove High School.
2. Number of students involved: Current Science Enrollment, 714.
3. Number of schools involved: 1.
4. Total number of teachers using any of the materials: 7.
5. Total number of students using any of the materials: 714.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Definitive.
7. Name and location of selected schools where the course is being taught: This program was not intended for use in other schools.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Program is team taught. There are no consultants assigned to the program.
2. Activities you conducted for pre-service and in-service teacher training: Not applicable.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: Not applicable.

4. Additional evaluative data available to interested individuals: A comprehensive evaluation of the first five years experience with the unified science program at Monona Grove has been submitted to the U. S. Office of Education. The substance of this report cannot be made available for public distribution until it is released by the U. S. Office of Education.

T. PROJECT PUBLICITY:

1. "An Integrated Concept-Centered Science Curriculum", Wisconsin School Board News, April 1966.
2. "Unified Science Education", Science Education News, March 1969 (AAAS).

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not reported in 1968.

V. PLANS FOR THE FUTURE:

1. Continued evaluation of the four-year program with revision based on experience.
2. Development of resource center programs to personalize the learning opportunities for students.

A. PROJECT TITLE: THE DEVELOPMENT OF MATERIALS FOR THE TRAINING OF SCIENCE EDUCATION PERSONNEL IN EDUCATIONAL TECHNOLOGY.

B. PROJECT DIRECTOR: Dr. Herbert A. Smith, Associate Dean for Education, C 134 Social Science Building, Colorado State University, Fort Collins, Colorado 80521. (303)491-5305.

C. PROJECT HEADQUARTERS:

1. Contact: Educational Technology Project, National Science Teachers Association, 1201 Sixteenth Street, N.W., Washington, D.C. 20036. (202)223-9400, Ext. 521.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: George H. Ziener, Project Administrator.

E. PROJECT SUPPORT:

1. Organizational agency: National Science Teachers Association.
2. Funding agencies: United States Office of Education, Bureau of Research; Higher Education Act, Title IV.

F. PROJECT HISTORY:

1. Principal originators: Dr. Herbert A. Smith, University of Colorado; Dr. Albert F. Eiss, National Science Teachers Association; Dr. Gabriel D. Ofiesh, Catholic University of America.
2. Date and place of Initiation: March, 1968; headquarters, National Science Teachers Association.
3. Overall project purpose: Preparation of validated, self-instructional materials to train science supervisors in the utilization of educational technology. Materials designed for implementation at a self-instructional institute utilizing educational technology to teach educational technology.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:

In utilizing the project material, the supervisor will:

1. identify the critical areas of activity in his functions as a science supervisor,
2. identify additional areas of possible activity not already a part of his present functions,
3. establish a working definition of educational technology as a process,
4. evaluate specific areas of educational technology application based on a process definition,
5. utilize a systems approach to developing an inservice institute for use in his own local activities, and
6. develop a series of system flow charts for specific management areas of his own local activities.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Discussion groups, Tape-slide presentation, Simulation activities (gaming), Printed text material.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: The materials have been prepared specifically for science supervisors. This very broad term includes individuals who are responsible for the directing and producing, implementing and teaching of the science curriculum. The titles of these individuals include Supervisor, Science Department Head, Science Advisor, Science Consultant, and Science Administrator. Although the materials are designed for this group, by their very nature, many of the packages will be widely applicable outside of the original population group. For example, in some initial validation activity, classroom teachers and administrators were involved.

K. MATERIALS PRODUCED:

Set I: Role of the Science Supervisor

Five packages of material, consisting of tape/slide presentations and applications handbooks have been prepared. They are designed to present an extensive view of a science supervisor's activities. The packages will give experienced supervisors a basis for evaluation of their activities, and new supervisors an expanded concept of their jobs. The packages are:

1. Currivulum Revision.
2. Evaluation.
3. Management.
4. Public Relations.
5. Research.

Set II: Introduction to Educational Technology

There are three levels of activity in this set. The first level is informative and attitudinal. The science supervisor is introduced to educational technology as a systematic process and, at any point in the five packages, may go to a second level of activity. This level provides initial skill development in educational technology areas. Two packages were prepared by the project; other materials are available commercially. Level three is a detailed bibliography for further skill development. These materials are intended to provide some familiarity with the topic but not to develop trained educational technologists. The packages developed by the project are:

Level One

6. Toward a Definition (of Educational Technology).
7. The Individual Learner (a model of a learning system).
8. Learning Pyramid (structure for learner-centered education)
9. Closing the Loop (problems in education and some possible answers through educational technology).
10. Production (how learner-centered materials are developed).

7

Level Two

11. Diagnostic Testing (what it is and how it is developed).
12. Criterion Referenced vs. Norm Referenced Testing (constraints).

Set III: An Application of Educational Technology

13. This set contains a simulation activity where the science supervisor is involved in (a) the outline development of an inservice program for his own use, (b) interaction with a simulated model program, and (c) revision of his own program as a result of interacting with the model. He finishes this set with a revised outline of an inservice program to meet his own local needs.

Set IV: Management Kit

14. This set consists of a kit for developing systems flow charts for a science supervisor's management goals. The science supervisor develops time sequenced flow charts of his actual activities and is given model charts with which he can interact. Interaction enables him to refine his own chart. Activities are such that the kit is open-ended and limited only by the supervisor's interest.

L. MATERIALS AVAILABLE FREE: None of the materials in K, i.e., 1-14, are presently available, except for validation purposes.

M. MATERIALS PURCHASABLE: Materials have not yet been released for publication by the U.S. Office of Education.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: No other language presently being considered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: A management handbook and structure for utilization of all the sets into an individualized instruction institute for science supervisors.

Q. PROJECT IMPLEMENTATION: Not applicable.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Implementation of these materials can be on an individual package or set basis. An institute for utilization of the entire program can be set up by the project staff. (This has been done for two large group validation exercises at West Palm Beach, Florida, and at Carlisle, Pennsylvania.)
2. Activities conducted for pre-service and in-service teacher training: Future inservice programs are anticipated, i.e., a series of individualized institutes, but presently no additional information is available.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Same as 2, above.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Validation activities have been run by the project staff, utilizing science supervisors not connected with the project. The results have been utilized as a basis for revision of materials and structuring of the institute program.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: Bibliographic references covering all of the sets.
4. Additional evaluative data available to interested individuals: Results of the validation activities, both with individuals and large groups, are available at the project office. Facilities are not available for extensive distribution.

T. PROJECT PUBLICITY:

1. Smith, Herbert A., "An Educational Technology Project in Science," Educational Technology, Vol X, No. 1, January, 1970.
2. A Project Summary Report is available on request.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Completion of package revision and final report, March 1970. Possibly a rewrite of materials for general supervisory use and implementation of institutes by the National Science Teachers Association.

A. PROJECT TITLE: EARTH SCIENCE CURRICULUM PROJECT (ESCP).

B. PROJECT DIRECTOR: William D. Romey, Director, Earth Science Curriculum Project, P. O. Box 1559, Boulder, Colorado 80302. (303)447-8150.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Films, laboratory equipment, video tape recordings of ESCP classes, visits to local schools using ESCP.

D. PRINCIPAL PROFESSIONAL STAFF: John F. Thompson, Co-director, Teacher Preparation; Larry A. Irwin, Staff Associate, Teacher Preparation; Robert E. Samples, Co-director, Environmental Studies; Dorothy S. Curtis, Staff Associate, Environmental Studies.

E. PROJECT SUPPORT:
1. Organizational agency: American Geological Institute.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originator: American Geological Institute.
2. Date and place of Initiation: May 1963; Boulder, Colorado.
3. Overall project purpose: To improve secondary school education in the earth and environmental sciences; to improve teacher education in these areas.

G. PRESENT COMMERCIAL AFFILIATIONS: Houghton Mifflin Company; Encyclopaedia Britannica Educational Corporation; Hubbard Scientific Company; Damon Educational, Inc.; Raytheon Education Company; King Screen.

H. PROJECT OBJECTIVES: This program provides an interdisciplinary approach to earth science which weaves the various disciplines together to provide a comprehensive view of the planet earth and its environment. A series of investigations provide the student with experience to better understand the content. The main difference between this and earlier efforts is the interdisciplinary treatment and the investigative nature of the approach. Objectives are stated in the ESCP Teacher Guide and in ESCP Newsletters.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Student directed inquiry, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Astronomy, meteorology, geology, oceanography, geography, environmental studies. Grade level: grades 8-10 depending on ability level of students, can be used with low ability students if investigations are the primary classroom activity. Textbook primarily designed for average and above - average students in the 13-15 age bracket.

K. MATERIALS PRODUCED:

1. Investigating the Earth (textbook/laboratory manual, and two-volume teacher's guide).
2. Teacher training film, TOWARD INQUIRY.
3. Newsletters Nos. 1-21.
4. Reference series pamphlets Nos. 1-9.
5. Subject matter films: 1. How Solid is Rock? 2. Reflections on Time. Teacher's Guide to films.
6. Brochures, catalogs, and teacher orientation material.
7. Laboratory investigations, equipment for.
8. Teacher Information Bulletin, published monthly.
9. Reprints of articles by staff members.
10. Teacher Preparation Packet (for university educators of earth science teachers).

L. MATERIALS AVAILABLE FREE:

Item 2, (on loan).
Item 3, published quarterly.
Item 6,
Item 8, available to teachers.
Item 9,
Item 10, available to college instructors.
Obtainable from Project Headquarters.

M. MATERIALS PURCHASABLE:

Item 1, (commercial edition available from Houghton Mifflin Company, 110 Tremont Street, Boston, Mass. 02107), Text $8.40, Guide, $10.56.
Item 2, available from local Encyclopaedia Britannica Education Corporation, regional office, cost $75.
Item 4, American Geological Institute, 2201 M Street N. W., Washington, D. C. 20037, $1.00 each (set price lower).
Item 7, complete package (class of 30 students) from Hubbard Scientific Company, $789; Damon Educational, Inc., $789; Raytheon Education Co. (formerly Macalester Scientific Corp.) about $800.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Spanish, Japanese, Portuguese, Korean, French, Iraqi, Turkish.

P. ADDITIONAL MATERIALS BEING DEVELOPED: 3 Pamphlets for ESCP Reference Series (Weather Maps, Geological References, and Geological Maps) should be published in 1970. Ten pamphlets in The ESCP Pamphlet Series are to be published in 1970 by The Houghton-Mifflin Co. These include: Field Study Guide to Rock Weathering, Field Study Guide to Soils, Field Study Guide to Layered Rocks, Field Study Guide to Lakes, Field Study Guide to Plutonic and Metamorphic Rocks, Field Study Guide to Fossils, Field Study Guide to Beaches, Astronomy Without a Telescope, Color of Mineral, and Meteorites. Films: MEN AT BAY (King Screen), additional films also planned with Encyclopaedia Britannica Educational Corp. Teacher preparation materials in the form of film loops and pamphlets are also under development. Environmental Studies Packets under development.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: At least 3,800.
2. Number of students involved: At least 300,000.
3. Number of schools involved: At least 3,500.
4. Total number of teachers using any of the materials: No good estimate available. Over 13,000 copies of the teacher's guides have been sold.
5. Total number of students using any of the materials: No good estimate available.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Totals all estimated on basis of book sales and estimate of average number of earth science students per teacher and earth science teachers per school.
7. Name and location of selected schools where the course is being taught: For information on specific schools in any given area, contact ESCP headquarters.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Teachers who conducted ESCP classes during the three years of nationwide evaluation are willing to give of their time in helping new teachers in their area. Project personnel, local college consultants, and Steering Committee members will help where possible. New plans are in progress for a major Earth Science Teacher Preparations Project (ESTPP) which will devote its major efforts to helping in the areas of pre-service and in-service training of earth science teachers.
2. Activities conducted for pre-service and in-service teacher training: Project personnel conduct an in-service course each semester through the University of Colorado; visits to summer and academic year institutes; promotion of in-service proposals; workshops. These are financed either by the National Science Foundation or by individual colleges. Individual colleges set their own fees. Special workshops and some drive-in workshops are sponsored by the ESCP publisher (Houghton Mifflin) and by the equipment manufacturers. Funds are being sought for increasing involvement in pre-service teacher training.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes; by The Psychological Corporation, (1964-66) and ESCP staff evaluations, and Champlin, R. "A Review of the Research related to ESCP": Journal of Geological Education, early 1970, in press.

2. Pertinent published research studies: See article by Champlin (S-1) for recent listing.

3. Brief abstract of in-house or unpublished research: In-house research now in progress on: effectiveness of in-service ESCP institutes; teaching "intrinsically motivated" courses in earth science (student-directed learning); studies of environmental studies programs conducted in inner-city areas; surveys on use of ESCP materials. Cooperative studies are being made with the Laboratory of Educational Research, University of Colorado. See 1968 report, p. 213 for information on uses of feedback in revision.

4. Additional evaluative data available to interested individuals: Interested individuals should contact ESCP headquarters for additional evaluative data. Persons wishing to utilize ESCP data are welcome to do so at project headquarters. Space and limited staff assistance can be made available.

T. PROJECT PUBLICITY:

1. Bisque, R. "Investigating the Earth": Geotimes, Vol. 10, No. 6, February 1966, pp. 14-18.
2. Curtis, D. S. "Designing Activities for Pupils in the Inner City": Professional Growth for Teachers, Croft Educational Services, 1969, first quarter issue, pp. 1-3.
3. Heller, R. L. "The Secondary School Earth Science Course in Science Education": Journal of Geological Education, Vol. 13, No. 3, January 1965, pp. 71-74.
4. Heller, R. L. "The Earth Science Curriculum Project - A Report of Progress": Journal of Research in Science Teaching, Vol. 2, 1964, pp. 330-334.
5. Heller, R. L. "The Earth Science Curriculum Project": Journal of Geological Education, Vol. 12, No. 2, June 1964, pp. 64-68.
6. Ladd, G. T. "ESCP...An Investigative Approach for Teaching Earth Science to Students of all Levels of Ability": Journal of Geological Education, Vol. 16, No. 2, April 1968, pp. 61-64.
7. Lewis, R. S. "ESCP Moves Ahead": Geotimes, Vol. 9, September 1968, pp. 16-18.
8. MacMahan, Horace L. "Princeton Project or ESCP: A Difficult Choice": School Science and Mathematics, Vol. 66, No. 1, January 1966, pp. 86-91.
9. Shea, J. H. "The Earth Science Curriculum Project - A Progress Report": The Science Teacher, February 1965, pp. 43-45.
10. Stephenson, R. C. "The Earth Science Curriculum Project": The Science Teacher, Vol. 31, No. 2, March 1964, pp. 21-23.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Completion or publication of: 1. Subject matter films, REFLECTION ON TIME. 2. Reference series pamphlets 7-9. 3. Newsletters 15-21. 4. Teacher Information Bulletins, 1968, 1969. Preparation of preliminary materials for environmental studies in urban classrooms; testing of these materials in 1969 and 1970. Conference/Workshops on 1. Design of in-service institutes. 2. Educating geological educators. 3. Pre-service preparation of earth science teachers. 4. Environmental studies materials.

V. PLANS FOR THE FUTURE: ESCP, as a major federally-funded project, will phase out in March of 1970. The American Geological Institute (AGI) hopes to maintain at least some activity under private funding. The ESCP textbook will be revised under the auspices of AGI. Cooperative efforts between AGI-ESCP and various commercial organizations will continue in the area of materials production (films, pamphlets, and other publications). Funds are being sought by the American Geological Institute for continuation and expansion of two new projects developed in the late stages of ESCP by the ESCP staff.

1. The Earth Science Teacher Preparation Project, to begin in spring, 1970, if funded. This project will devote full time to developing better programs for pre-service and in-service preparation of earth science teachers, college teaching assistants in the earth sciences, and college professors involved in teacher preparation. Activities of this project will consist of a series of conferences, workshops, and writing conferences. New materials for teacher preparation and for secondary and elementary school classrooms will be developed, with emphasis on open-classroom approaches and student-directed learning experiences. Coordination and production of research in earth science education will also be conducted.

2. The Environmental Studies Project, to begin in spring 1970, if funded. This project is intended to develop materials and techniques for helping urban students study and learn about their environment. Elements of earth science, biological sciences and social science will be involved. Students will investigate subjects of their own choice and the teacher's role will become one of friend and helper rather than of authority or manager. Materials will be developed and tested within a large number of inner-city classrooms. Project staff will assemble and disseminate these materials in "Environmental Studies Packets" for teachers and students. Teacher training for use of newly developing techniques of helping students motivate themselves and learn about the environment will form an important activity of the project staff.

Inquiries about the status of both the Earth Science Teacher Preparation Project and the Environmental Studies Project should be addressed to William D. Romey, Director, ESCP. It is anticipated that remaining activities of ESCP and the two new projects will be housed at address given for ESCP above.

A. PROJECT TITLE: ECCP - THE MAN MADE WORLD.

B. PROJECT DIRECTOR: Dr. E.J. Piel, Executive Director, Engineering Concepts Curriculum Project, The Polytechnic Institute of Brooklyn, 333 Jay Street, Brooklyn, New York 11201.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Equipment and laboratory development.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. J.G. Truxal, Vice Pres. Academic Affairs (Co-Director of ECCP), The Polytechnic Institute of Brooklyn. Dr. E.E. David, Jr., Executive Director, Communications Systems Research Division, Bell Telephone Laboratories, Murray Hill, N.J. 07971.

E. PROJECT SUPPORT:
1. Organizational agency: National Science Foundation.
2. Funding agency: National Science Foundation, Washington, D.C.

F. PROJECT HISTORY:
1. Principal originators: Dr. E.E. David, Dr. J.G. Truxal, Dr. N. Hall.
2. Date and place of Initiation: 1965; Commission of Engineering Education.
3. Overall project purpose: Develop technological literacy

G. PRESENT COMMERCIAL AFFILIATIONS: McGraw-Hill Book Co., Publishers. Equipment: American Machine & Foundry Co. and the Measurement Control Devices Corporation.

H. PROJECT OBJECTIVES:
1. Course materials cover the fields of science, mathematics and social science.
2. Emphasizes the use of "Systems" approach to solving social, personal, political, and environmental problems.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Seminars, Discussion groups, Computer simulations using analog and digital computers when available.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: 10, 11 and 12th grade students in middle 2/3 of ability in high school; also used in community colleges and liberal arts colleges.

K. MATERIALS PRODUCED:
1. Text - The Man Made World.
2. Laboratory manual.
3. Teacher's manual.

4. Newsletters including technical notes.
5. Discussion "games".
6. Tests.

L. MATERIALS AVAILABLE FREE: Newsletter. From: ECCP Headquarters, Box 100, 333 Jay Street, Brooklyn, New York 11201.

M. MATERIALS PURCHASABLE:
Items 1, 2: McGraw Hill Book Co., 330 West 42nd Street, New York, New York 10036.
Item 3: from project headquarters.
Items 5, 6: from project headquarters.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: Approximately 200.
2. Number of students involved: Approximately 7,000.
3. Number of schools involved: Approximately 175.
4. Total number of teachers using any of the materials: Approximately 225.
5. Total number of students using any of the materials: Approximately 7,500.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Bay High School, Bay Village, Ohio; Long Island Lutheran High School, Brookville, New York; Monroe Senior High School, Monroe, Wisconsin; Bonneville High School, Ogden, Utah; New Albany Senior High School, New Albany, Indiana; Southeast High School, Brandenton, Florida; Ferris High School, Jersey City, New Jersey; Sahuarita High School, Sahuarita, Arizona; Needham-Broughton High School, Raleigh, North Carolina; Nathan Hale High School, Seattle, Washington; McCluer High School, Florissant, Missouri; Charles W. Woodward High School, Rockville, Maryland; Lincoln High School, Lincoln, Rhode Island; Wichita High School, South, Wichita, Kansas; Phillis Wheatley Senior High School, Houston, Texas; Ben Franklin High School, Philadelphia, Pennsylvania; Glenville High School, Cleveland, Ohio; John Burroughs High School, Burbank, California; University of California, Irvine, California; UCLA; PIB; University of Wisconsin; Brown University; Georgia Tech.; Memphis State; University of Pennsylvania; some community colleges.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Engineer consultants are available for all teachers using materials. Project staff also available as consultants to teachers and administrators.

2. Activities conducted for pre-service and in-service teacher training: NSF supported summer institutes, CCSS institutes, and in-service institutes.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Text and lab manual at $8.25 per set. Laboratory equipment.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by the Psychological Corporation.

2. Pertinent published research studies: Not answered.

3. Brief abstract of in-house or unpublished research: Course can be effectively taught to 10, 11 and 12th graders in middle 2/3 of ability scale. Girls do as well as boys. Students encourage other students to take the course.

4. Additional evaluative data available to interested individuals: Available from project headquarters.

T. PROJECT PUBLICITY:

1. Science, May 17, 1967.
2. The Physics Teacher, February 1970.
3. The Science Teacher, May 1970.
4. International Science and Technology, September 1967.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Revision of text, lab guide and teachers manual will be available in January 1971.

V. PLANS FOR THE FUTURE:

1. Final edition, January 1971.
2. Community College writing conference, June 1970 - June 71.
3. Junior High School conference, Fall 1970.
4. Teacher Preparation Conference, Fall 1970.

A. PROJECT TITLE: ELEMENTARY CURRICULUM MATERIALS PROJECT (ECMP).

B. PROJECT DIRECTOR: Richard C. Youngs, Metcalf Laboratory School, Illinois State University, Normal, Illinois 61761. (309)438-2453.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Materials can be seen.

D. PRINCIPAL PROFESSIONAL STAFF: Richard C. Youngs, Director; Charles R. Hicklin, Associate Director; Robert E. Rumery, Evaluation Specialist; Richard C. Youngs and Thomas F. Edwards, Science Specialists; Kenneth A. Retzer, Wilson P. Banks, and John H. Esbin, Jr., Mathematics Specialists; Larry Kennedy, Language Arts Specialist.

E. PROJECT SUPPORT:
1. Organizational agency: Illinois State University.
2. Funding agencies: Department of Program Development for Gifted Children, State of Illinois; Office of the Superintendent of Public Instruction, Springfield, Illinois.

F. PROJECT HISTORY:
1. Principal originators: Theodore Sands and Charles R. Hicklin.
2. Date and place of Initiation: 1961; Illinois State University.
3. Overall project purpose: To produce self-instructional materials for gifted children.

G. PRESENT COMMERCIAL AFFILIATIONS: Weber-Costello, 1900 North Narragansett, Chicago, Illinois 60639.

H. PROJECT OBJECTIVES: This project has addressed itself to the problem of developing instructional materials in a self-instructional format for use with gifted students in the early primary grades. Specific objectives of this project have been:
1. To create and test a sequence of instructional experiences which would enable a gifted student while working independently to develop concepts which were considered basic to a discipline but not usually encountered in the early elementary grades.
2. To develop these concepts in a way which would require the bringing into play higher thought processes such as translating, interpreting, extrapolating, applying, analyzing, and evaluating.
3. To identify a strategy of instruction which would enable such materials to be used in the public schools with a minimum of teacher attention and participation, require no special

training of the teacher, and be adaptable to the current patterns of administrative arrangements for instruction of the gifted.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Programmed instruction, Laboratory investigations.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Atomic Structure, Nature of Molecules, Measurement, K-4, Gifted.

K. MATERIALS PRODUCED:

1. Measurement:
   - a. Teacher manual.
   - b. Work booklets, 18 exercises.
   - c. Record, 18 exercises.
   - d. Manipulative materials.
   - e. ECMP Measurement Achievement Test.
2. Atomic Structure:
   - a. Teacher manual.
   - b. Work booklet, 16 exercises.
   - c. Records, 16 exercises.
   - d. Experimental apparatus.
   - e. Manipulative materials.
   - f. ECMP Atoms Achievement Test.
3. Nature of Molecules:
   - a. Teacher manual.
   - b. Work booklets, 14 exercises.
   - c. Records, 14 exercises.
   - d. Experimental apparatus.
   - e. Manipulative materials.
   - f. ECMP Atoms Achievement Test.
4. 1965 Final Report. The Development and Testing of Instructional Materials for Gifted Primary Pupils.
5. 1966 Final Report, Concept Development Material for Gifted Elementary Pupils.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE:

Kits of instructional materials:

Items 1a - d	300-681 Measurement	$29.95
Items 2a - e	300-673 Atomic Structure	$35.95
Items 3a - e	300-699 Nature of Molecules	$27.95

From Weber-Costello, 1900 North Narragansett, Chicago, Illinois 60639.

Item 4	Microfiche ED010766	.50
Item 5	Microfiche ED010998	.25

From EDRS, National Cash Register, 4936 Fairmont Avenue, Bethesda, Maryland 20014.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION: Unknown; kits go to individual teachers.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: None.
2. Activities conducted for pre-service and in-service teacher training: None.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Included with materials.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: 1965 Final Report. The Development and Testing of Instructional Materials for Gifted Primary Pupils, Microfiche No. ED010766 (.50) ERIC; 1966 Final Report, Concept Development Material for Gifted Elementary Pupils, Microfiche No. ED010998 (.25) ERIC.
3. Brief abstract of in-house or unpublished research: Not answered.
4. Additional evaluative data available to interested individuals: See No. C-1 above or write director.

T. PROJECT PUBLICITY: Not answered.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE: Production of units for later elementary in the areas of geography, social studies, meteorology. Commercial publication of the present units.

A. PROJECT TITLE: ELEMENTARY SCIENCE STUDY (ESS).

B. PROJECT DIRECTOR: Frank Watson, Director/ESS, 55 Chapel Street, Newton, Massachusetts 02160. (617)969-7100, Ext. 504.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: In-house workshops are held periodically for school administrators, science supervisors, etc. Visits should be made by appointment only, through Mrs. Dionne's office. (Ext. 510)

D. PRINCIPAL PROFESSIONAL STAFF: David Alexander, Edith H.E. Churchill, Rose Lea Crowley, Mary Gillmor, Joe Griffith, Adeline Naiman, Emily Romney, Frank Watson, Nancy Weston.

E. PROJECT SUPPORT:
1. Organizational agency: Educational Development Center (formerly Educational Services Incorporated).
2. Funding agencies: National Science Foundation. (ESS is sometimes asked by teacher training or research organizations or schools to work out a program of introduction of the materials, and ESS has accepted small grants for such short-term efforts, e.g., Peace Corps, Cardozo Model School District.)

F. PROJECT HISTORY:
1. Principal originator: Education Development Center (formerly Educational Services Incorporated.)
2. Date and place of Initiation: 1960; Cambridge, Massachusetts.
3. Overall project purpose: With the increasing importance of science and technology in today's society, there was a need to up-grade science and math in the secondary schools to better prepare students for college studies in these areas. A number of curriculum development groups undertook this task, and out of one of these the Physical Science Study Committee--Educational Services Incorporated (now known as Education Development Center) was organized. As the PSSC program progressed, it was decided to initiate a similar effort for the elementary schools with emphasis on materials that would engage the interest of all students.

G. PRESENT COMMERCIAL AFFILIATIONS: Webster Division, McGraw-Hill Book Company.

H. PROJECT OBJECTIVES: Primarily ESS hopes to develop more meaningful science materials for use by children in the form of units which schools can arrange in a variety of sequences to meet their own requirements. The program is a highly individual, experimental one in which all children have access to the materials for open-ended rather than teacher or textbook directed investigations. Careful attention is given to all materials used so that all equipment looks like materials which are normally accessible to children in their own environment and not imposingly "scientific." A mix of university scientists and master teachers work together in the laboratories and in classrooms to test and revise their ideas before the materials are released for general use in the schools. ESS materials have been used equally successfully in middle-class suburban and low socio-economic areas, large cities and small towns, and a great variety of different situations.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: See Section K for descriptions of each unit.

K. MATERIALS PRODUCED:

COMMERCIAL EDITIONS AVAILABLE (Fall of 1970)

1. ANIMAL ACTIVITY (Grades 4-6)
This unit involves children in a direct study of the activity of small animals. It introduces several techniques for observing and measuring animal behavior under different conditions. The children use a small exercise wheel coupled to a counter. This apparatus encourages children to design experiments, keep records, and analyze their data. Equipment: Animal activity wheel; printed matter: teacher's guide, student booklets (Experiments on Animal Activity and The Curious Gerbils)

2. ATTRIBUTE GAMES AND PROBLEMS (Grades K-9)
This unit provides an opportunity for children to deal with problems of classification and the relationship between classes. The kinds of problems worked on here lend themselves to applications in many curriculum areas--science, social studies, mathematics, or wherever classification and dealing with relations between classes are called for. The same colorful materials (A Blocks, Color Cubes, People Pieces, colored loops, stickers, and label cards) are used, though in different ways, from kindergarten through ninth grade and beyond. Equipment: Three kinds of blocks, loops; printed matter: teacher's guide, problem cards (in English and Spanish), geometric stickers.

3. BATTERIES AND BULBS (Grades 4-6)
BATTERIES AND BULBS is an introduction to the study of electricity and magnetism. In the course of this study, each child carries out experiments with simple and safe equipment--flashlight batteries, small bulbs, various kinds of wire, magnets, and a compass--and draws conclusions based on his observations. The conclusions and predictions that a child makes can be tested by himself or by other children. Equipment: Flashlight batteries, small bulbs, various kinds of wire, compresses, magnets; printed matter: teacher's guide, student prediction

and project sheets.

4. BEHAVIOR OF MEALWORMS (Grades 4-8)

BEHAVIOR OF MEALWORMS stimulates children to ask questions about the observable behavior of an unfamiliar animal and then directs them to ways of finding the answers for themselves. As children observe and experiment, they learn some things about the process of scientific inquiry. Equipment: Mealworms, food, containers; printed matter: teacher's guide, two student booklets (How Barn Owls Hunt and How A Moth Escapes from its Cocoon), set of pictures; film (for teachers) one 16mm black and white, sound film: How to Make a Mealworm Back Up.

5. BONES (Grades 4-6)

This unit engages the students in becoming familiar with a variety of bones; noticing similarities and differences; and making skeletons. Equipment: Disarticulated skeletons, assorted bones; printed matter: teacher's guide, two student booklets (Bones Picture Book, How to Make a Chicken Skeleton) film: five 8mm loops, black and white: X-ray Motion Pictures Head and Neck, X-ray Motion Pictures Shoulder, X-ray Motion Pictures Knee and Elbows, X-ray Motion Pictures Hand, X-ray Motion Pictures Foot.

6. BRINE SHRIMP (Grades K-4)

Brine shrimp are small, salt-lake crustaceans, easily hatched and cared for in any classroom and fascinating to study. Children can easily watch their own animals hatch, grow, and eventually have young of their own. Each child, working alone or with a classmate, can raise and maintain his own brine shrimp, because the animals are small and easy to maintain. Equipment: Brine shrimp eggs, salt water magnifiers, containers; printed matter: teacher's guide; film: one 16mm, color, silent: Brine Shrimp; two 8mm loops, color: Brine Shrimp I, Brine Shrimp II.

7. BUDDING TWIGS (Grades 4-6)

In this unit, planned for late winter and early spring, children examine in the classroom the structure of twigs and the development of buds forced into bloom out of season. Through observation and dissection, children become aware of the varities and complexities of plant construction. The guide contains teaching suggestions, some possible avenues of exploration, information about collecting twigs, and a list of materials needed for the activities. Equipment: Twigs, containers; printed matter: teacher's guide.

8. BUTTERFLIES (Grades K-5)

Children can witness the complex and fascinating life cycle of an insect by raising butterflies in their classroom. While the children watch and care for their own animals, they ask many questions about them. In time they find answers to some of their questions, and begin to develop a sense for the way in which an animal lives, grows, and reproduces. Equipment: Butterfly eggs, cocoons; printed matter: teacher's guide; film: one 16mm, silent, color: The Life Cycle of a Butterfly; six 8mm loops, color: Black Swallowtail Butterfly:

Egg Laying, Hatching, and Larvae; Black Swallowtail Butterfly: Larval Molt; Black Swallowtail Butterfly: Preparing to Pupate (1); Black Swallowtail Butterfly: Preparing to Pupate (2); Black Swallowtail: Pupal Molt; Black Swallowtail Butterfly: Emergence.

9. CHANGES (Grades 1-4)

This unit gives children an opportunity to see, distinguish, and understand something about the changes in organic and inorganic substances that are caused by the growth of living organisms, such as bacteria, as well as those brought by nonliving processes, such as rusting and melting. In the course of this unit, the children make direct observations of the continual change that characterizes the universe. Equipment: Plastic boxes, baby food jars, foods, liquids, metals, crystals, powders, seeds; printed matter: teacher's guide.

10. CLAY BOATS (Grades 2-6)

With CLAY BOATS, children investigate the possibility of making a lump of clay float in a container of water. The children make shapes out of the clay, and, when they have made a shape that floats, they experiment to see how much "cargo" their "boats" will hold. In designing their boats, children consider such questions as, "Why do some shapes hold more cargo than others?" "Why are some materials better than others for building boats?" "How can one boat be compared with another?" Equipment: Clay (oil base), containers--uniform weights for loading materials; printed matter: teacher's guide.

11. COLORED SOLUTIONS (Grades 3-8)

This unit utilizes food coloring, water, salt, and transparent containers to introduce children to ideas associated with density and the layering of liquids. In time, the children develop a scheme for ordering the liquids they are exploring according to "weight for the same amount." Equipment: Plastic trays and cylinders, salt solutions, eye droppers, and food coloring; printed matter: teacher's guide.

12. CRAYFISH (Grades 6-8)

Crayfish are interesting and manageable animals to keep in a classroom. Children enjoy handling crayfish and investigating their behavior. They may be collected in most parts of the country at all times of the year or purchased inexpensively enough to give each pair of children an animal to work with. Many of the children's questions about crayfish can be answered by observation or by simple experiments. Equipment: Crayfish containers; printed matter: teacher's guide.

13. DROPS, STREAMS AND CONTAINERS (Grades 3-4)

This unit is a guide to play and investigation with liquids. Children examine flow, drop formation, and other properties of water, soapy water, oil, and other available liquids, using a variety of containers, surfaces, drops, and tubes. Equipment: Bottles with holes, caps with holes, eye droppers, medicine caps, tubing, paper towels and wax paper; printed matter: teacher's guide, problem cards.

14. EGGS AND TADPOLES (Grades K-6)
This unit encourages children's natural interest in living things through the exploration of frog eggs and tadpoles. Whether the eggs are collected from a pond or purchased from a supplier, they are exciting to watch as they change in a few days from nondescript blobs to living, swimming animals. "How did it all happen?" children wonder. "What do they eat?" "How do they know how to swim?" Many questions can be answered from the children's own observations. Often, they go back to watch a second batch of eggs develop and hatch. Equipment: Fertilized frog eggs, aquaria, pond water; printed matter: teacher's guide; film: two 16mm, color, silent: Frog Development: Fertilization to Hatching; Frog Development: Hatching through Metamorphosis; eight 8mm loops, color: Frog Egg I: First Cell Division to Early Neural Fold; Frog Egg II: Development of the Body Regions; Frog Egg III: Continued Development to Hatching; Frogs: Pairing and Egg Laying; Artificial Fertilization of Frog Eggs; Frogs: Pituitary Preparation; Tadpoles I; Tadpoles II.

15. GASES AND "AIRS" (Grades 5-8)
This unit is composed of closely linked laboratory experiments investigating the nature of air and the changes it undergoes when interacting with common objects in our environment. Experiments demonstrate that air is "real" even though it can't be seen, and that its presence can be proven. Students undertake investigations with the gases of the atmosphere ("air") and the "things" of the universe (rock, iron, water, seeds, a candle). Equipment: Tubes, candles, steel wool, seeds; printed matter: teacher's guide, worksheets; film: one 16mm, black and white, sound: Gases and "Airs" in the Classroom (for teachers), four 8mm loops, color: Candle Burning Techniques, Candle Burning I, Candle Burning II, The Mouse and The Candle.

16. GEO BLOCKS (Grades K-6)
The GEO BLOCKS are a set of unfinished hardwood blocks small enough to be used on school desks. They come in a wide range of shapes and sizes that make possible a great variety of structures and designs, both simple and complex. The blocks are related to one another in volume, and all but three can be made up from the smaller blocks in the set. When a child runs out of large blocks, he can match them with combinations of smaller ones, thus gaining a sense of volume equivalents. Equipment: 330 blocks; printed matter: teacher's guide and picture cards.

17. GROWING SEEDS (Grades K-3)
This unit gives children an opportunity to become acquainted with science as early as the first grade. They gather and bring in small objects they think might be seeds. They ask questions and devise ways to find their own answers. Children soon discover that they can distinguish a seed from things it resembles by planting it and watching to see if it will grow. Equipment: Seeds, soil, containers; printed matter: teacher's

guide; film: two 8mm film loops, color: Bean Sprouts, Plant Growth-Graphing.

18. ICE CUBES (Grades 3-5)

This unit asks questions to which children can find answers through direct experimentation. The students experiment with ice cubes to determine which factors influence the rate at which ice melts. They try insulating ice cubes with a variety of materials. They race different shapes of ice to see the effect on the melting rate of larger or smaller amounts of surface area. Equipment: Thermometers, ice, containers: printed matter: teacher's guide.

19. KITCHEN PHYSICS (Grades 5-8)

In KITCHEN PHYSICS, the student examines liquids--how they form drops and puddles; how they fall and break up; how fast they flow through various sizes of openings; how they heap up, are absorbed, evaporate, mix, and dissolve. He assembles and uses simple equipment, such as a balance, which he then modifies for use as a tensiometer. Equipment: Drip tubes of varying diameters, liquids, balances, droppers, container; printed matter; teacher's guide, worksheets; film: three 8mm film loops, color: Beading of a Water Column, Water Rise in Blotter Strips Exposed and Enclosed.

20. LIFE OF BEANS AND PEAS (Grades K-4)

This unit encourages children to plant beans and peas, tend them, and observe them throughout one life cycle and on into a second generation grown from class-produced seeds. Children test the effects of different growing conditions on the plants. They ask questions about what they see and answer their own questions through additional observation and experiment. Equipment: Seeds, soil, containers; printed matter: teacher's guide.

21. LIGHT AND SHADOWS (Grades K-3)

In exploring the world of LIGHT AND SHADOWS, both outdoors and indoors, children find new meanings in a number of ordinary objects and phenomena. When children are exploring shadows, they are experimenting with spatial relationships in simple ways. This unit has been taught in Grades K-3 and could be extended to the middle grades as well. The scheduling is quite flexible and will often depend on the weather (for outdoor activities) or a child's inspiration. Printed matter: teacher's guide.

22. MICROGARDENING (Grades 4-7)

This unit introduces children to the molds--a group of microscopic living things very different from the plants with which they are familiar. The children working with MICROGARDENING become familiar with principles and procedures that have contributed to man's knowledge and understanding over the past 200 years. The five areas of study covered in the unit are: What are molds like? What influences the growth of molds? Where do molds come from? What influences the rate of mold growth? What can molds do? Equipment: Containers, nutrient media; printed matter: teacher's guide; booklet, Illustrated

Handbook of Some Common Molds; film: seven 8mm film loops; Alternaria, Rhizopus, Fusarium, Penicillium, Trichoderma Growth Rings, Rotting Pear, Mushroom Growth and Reaction.

23. MIRROR CARDS (Grades 1-7)

The basic problem posed by Mirror Cards is one of matching, by means of a mirror, a pattern on one card with a pattern shown on another card. The children find the colors and shapes on the cards pleasing and fun to work with. They enjoy the challenge presented and work ahead on their own requiring little supervision from the teacher. Equipment: Cards (21 different sets), four mirrors; printed matter: teacher's guide.

24. MOBILES (Grades 2-3)

MOBILES is a unit for the primary grades that describes very simple ways in which children can experiment with balance by making constructions that are provocative and delightful to look at. It may be presented as an activity that is an end in itself, or it may be incorporated into more systematic explorations involving balancing and weighing, such as the ESS unit, PRIMARY BALANCING. Equipment: Reeds, twine, hangers, clips; printed matter: teacher's guide.

25. MYSTERY POWDERS (Grades 3-4)

The activities in MYSTERY POWDERS deal with the properties of ordinary white powders (starch, baking soda, plaster of Paris, granulated sugar, and salt) and the use of indicators in identifying them and detecting their presence in mixtures. The powders are safe for children to handle and taste and are inexpensively obtained from drug, grocery, and hardware stores. From beginning activities in which they use their senses to become familiar with the powders, students progress to more sophisticated analysis, utilizing indicators and other laboratory techniques. Equipment: Sugar, salt, baking soda, starch, plaster of Paris, vinegar, iodine, heat source, containers; printed matter: teacher's guide.

26. PATTERN BLOCKS (Grades K-6)

This set of 250 flat blocks includes six shapes and colors. Except for the two-inch sides of the trapezoid, all the sides are an inch long. This allows children to build closed as well as open designs and to acquire a feeling for the size and shape relationships among the blocks. Pattern Blocks lend themselves to work in counting and arithmetic, combinations and equivalents, linear and area measurement, congruency and similarity, symmetry, angle measurement, series, sequences, and modular form. Equipment: 250 blocks, mirrors; printed matter: teacher's guide.

27. PEAS AND PARTICLES (Grades 4-8)

This is a unit in which children deal informally with estimation and large numbers in ways that may be new to them. They answer questions--How many? How big? How far away?--not with worksheet or arithmetic-test precision, but as we tend to answer questions ordinarily, with estimates and "educated" guesses. Children are ingenious when it comes to thinking of methods of counting and estimating large numbers. How important is rounding off? When is an exact answer needed? These are some of the questions that children discuss in the course of their work with Peas and Particles. Equipment: Rice, peas, beans, balls, containers; printed matter: teacher's guide, picture packet.

28. PENDULUMS (Grades 4-6)

PENDULUMS gives children a chance to observe, investigate, and reflect upon the many physical phenomena associated with swinging objects. A variety of bobs, differing in weight, size, and shape, lead the children to ask questions about a pendulum's behavior and to find their answers from the pendulum itself. Here is an opportunity for the students to make and test predictions in a readily controllable situation. Equipment: Frame, string, bobs; printed matter: teacher's guide; film: five 8mm loops, color: Sand Pendulum I: Drawing Circles, Lines and Ellipses; Sand Pendulum II: Drawing on a Turntable; Sand Pendulum III: Drawing Lines on a Traveling Table; Sand Pendulum IV: Slowing Down; Sand Pendulum V: Pouring Sand into Soda Straws.

29. POND WATER (Grades 4-7)

POND WATER introduces children to an exciting array of living creatures, invites them to make their own collections on field trips, distinguish their finds through observation and description, and go on to study the tiny animals they have collected. The can begin to understand the complicated interactions of pond life. And most important, they will learn to use their eyes and their minds to find out about the world in which they live. Equipment: Pond water, containers, microscopes; printed matter: teacher's guide, study cards.

30. PRIMARY BALANCING (Grades K-4)

PRIMARY BALANCING affords children the opportunity to explore balancing and weighing at first hand. This unit helps them develop a general understanding of weight and balancing from weighing, comparing, sorting, counting, and balancing a large assortment of items on equal-arm balances, on flat wooden beams, and in suspended pans. Preliminary experiences with balancing are followed by more specific investigations into the physical laws of balance and the idea of weight and its measurement. Equipment: Walking boards--four foot balance boards, pan balances, things to weigh; printed matter: teacher's guide.

31. PRINTING (Grades 1-6)

PRINTING makes available a simple printing press for classrooms and a resource book for the teacher. When a printing press is an everyday part of the classroom furniture, children will use it as a tool to carry out work in many areas. One child may print a poem, or a group of children may decide to put out a newspaper. Equipment: Printing press, type, printing ink, type rack, ink rollers; printed matter: teacher's guide.

32. ROCKS AND CHARTS (Grades 3-6)
ROCKS AND CHARTS encourages children to look closely at the characteristics of rocks (and other things), to establish their own ways of comparing objects, to agree upon useful standards, and to find greater possibilities in their own collections. Equipment: Rocks, balances, streak plates, hand lenses; printed matter: teacher's guide.

33. SAND (Grades 2-3)
This is a unit which uses graded, colored sand which, appealing aesthetically, invites a wide variety of explorations of a scientific nature. Sand can be thought of as analogous to water, and poured, measured and dripped. Sand can also be sorted, piled, looked at through a hand lens, rolled down various surfaces, strained, crushed, and weighed. Equipment: Graded colored sand, sieves, sand table; printed matter: teacher's guide.

34. SENIOR BALANCING (Grades 4-8)
This is a unit in which children hang washers on strips of pegboard suspended from a nail. They learn how to identify problems involving balance and to make use of various strategies to solve the problems. An intuitive understanding of moments of force and center of mass underlie the study. Equipment: Pegboard, nails, washers, and others; printed matter: teacher's guide, cards.

35. SPINNING TABLES (Grades 1-3)
A spinning table is a simple piece of equipment with which a child can explore the paradoxical behavior of things that move in circles. The table, a free moving, circular disc, can be turned by hand or with a hand crank. A smooth chalkboard insert for the table makes it possible to draw circles, spirals, and other shapes on the table. A pegboard insert for attaching objects to the table, allows children to watch how objects behave as the table spins. Equipment: Hand-driven turntables, marbles, tubes, blocks; printed matter: teacher's guide.

36. STRUCTURES (Grades 2-6)
As the children build with materials (newspaper, clay, sticks, scotch tape, and others) they begin to see the relationship between material, function, and form. By slowly working with a set of various materials, a wide range of experience is provided. Equipment: Clay, straw, string, Plasticine, paper, tape, and pins; printed matter: teacher's guide.

37. TANGRAMS (Grades K-8)
The tangram is a fascinating geometric puzzle consisting of seven pieces dissected from a square. This adaptation includes a set of problem cards that begin with smaller groups of the seven-piece set in order to help the children develop skill in dealing with basic geometric relationships before they confront more complex problems. Equipment: Tangram pieces (seven pieces); printed matter: teacher's guide, tangram cards (120 patterns of varying difficulty divided into three sets.)

38. TRACKS (Grades 4-6)
Each set of animal tracks is a record of the creature's activity during the time it was there. This unit offers children an opportunity to learn to use their eyes and their minds to unravel the events that shaped the tracks they find in pictures and in their everyday environment. A track can indicate many things: the identity of an animal; the direction in which it was going; whether it was moving quickly or slowly; how long ago the animal lived; its mood; and, in some cases even its sex; the food it ate; and the environment it needs in order to survive. Printed matter: teacher's guide, picture book for students, track card sets--Mystery Cards (10 cards), small track cards (52 cards), animal photographs (14); one 8mm loop, black and white. The Horse: Walk, Trot, and Gallop, in Slow Motion.

39. WHERE IS THE MOON? (Grades 3-7)
Where is the Moon? is an informal introduction to observational astronomy. During a three month period, children are given approximately fifty notes called "Reminders." Each note describes an event that the children can see in the sky. Their observations of the sky--specifically of the moon in relation to Venus, Jupiter, and the sun, and its shape and position in relation to familiar landmarks--are the basis of the study. Children observe, make predictions about what they will see, keep records and notes of their observations, and begin to look for patterns from month to month. Printed Matter: Teacher's guide, student booklet (Where Was the Moon), Reminders (series of approximately fifty notes on the sky and moon.)

COMMERCIAL EDITIONS EXPECTED TO BE AVAILABLE BY FALL OF 1970.

1. ANIMALS IN THE CLASSROOM (Grades K and beyond)
Animals in the Classroom is a resource book for teachers to draw upon before and while they are keeping animals in school. It contains a teacher's account of a year with desert animals in her primary classroom; methods for keeping gerbils and two kinds of lizards; a checklist of things to consider, whatever animals you have; plans for building a variety of simple, inexpensive cages; and a bibliography of books on animal care. The book is written to encourage and to help people to keep animals of all kinds in their classrooms, and to show how they can become a focus for language, mathematics, social studies, and science activities. Printed Matter: Resource book for teachers.

2. BALLOONS AND GASES (Grades 5-8)
BALLOONS AND GASES gives students an opportunity to prepare and collect gases and to discover some of their properties. They conduct tests which enable them to distinguish some of the common gases from one another. The unit begins with the use of a colored acid-base indicator, and with some common acids and bases. Equipment: Apparatus for generating and

collecting gases, various common chemicals, several balances; printed matter: teacher's guide.

3. BATTERIES AND BULBS II (Grade 5 and beyond)
This resource book contains illustrated suggestions for almost fifty different battery operated gadgets and projects. All of the gadgets are relatively simple, and can be constructed with simple tools from common scrap materials. The gadgets are intended to be used as a source of ideas rather than as models to be copied. Printed Matter: Resource book for students.

4. DAYTIME ASTRONOMY (Grades 5-8)
Keeping track of familiar events in the sky is a good introduction to astronomy. Daytime Astronomy suggests ways to help children organize their observations of familiar phenomena and changes in the sky throughout the year. The activities are grouped into various sections. "Where is the Sun?" deals with long-range changes in the apparent motion of the sun. "Shadows and Shadow Clocks" centers around the sun's daily motion and telling time. In "Globe Problems", children use a globe oriented outdoors in sunlight to investigate problems of time, seasons, and directions. In "The Earth and Moon: A Scale Model", children construct a scale model of the earth and moon, and use them outdoors to set up astronomical events in miniature. Equipment: Globes, shadow sticks; printed matter: teacher's guide.

5. EARTHWORMS (Grades 4-6)
Children examine the habits and preferences of these small, easy-to-care-for animals. How do earthworms move? Is this a worm egg? Can worms live in puddles? They devise ways to find out what kind of soil, how much moisture and how much light earthworms prefer. Equipment: Styrofoam cooler, transparent plastic tubes, plastic containers, earthworms; teacher's guide.

6. HEATING AND COOLING.
Heating and Cooling deals primarily with heat and heat conduction through a variety of materials: metal sheets, wires, rods, and screens. Small candles are the source of heat. With equal size rods of different metals, glass rods, and rods of different diameter, children compare the effect of size and substance on heat conduction. They have heat "races" to see which material gets hot or cools fastest, and they devise ways to time the rate at which heat travels through rods and other pieces of metal. Some children try to heat rods to the melting point, while others try to prevent heat from passing through a rod or metal sheet. Equipment: Sheets, wires, rods and screens of various metals, heat sources, glass rods. Printed Matter: Teacher's guide, problem cards for students.

7. MAPPING (Grades 5-7)
Mapping offers activities through which youngsters can learn to describe their environment in terms of symbols. In Mapping, children must devise ways to describe locations in words or pictures, to represent three dimensions in two, and to show

the relative position and size of objects in a space. Equipment: Blocks, puzzles, three-dimension graphs. Printed Matter: Teacher's guide, sets of mapping cards.

8. MATCH & MEASURE.

Match & Measure is a resource book for the primary grades illustrating many ways in which children can work with measurement as a practical tool in the context of other classroom projects. The purpose of the book is to encourage teachers to use an informal approach to teaching measurement with young children to help them to build a basic understanding of the measurement process, so that they will be able to use more formal measuring techniques with understanding. The activities in the book deal with measuring lengths, areas, and volumes; the approach is applicable to other kinds of measurement as well. Equipment: Tape measures, ticker tape, calipers, measuring wheels, Geo-Boards and an assortment of containers. Printed Matter: Teacher's guides.

9. MOSQUITOES (Grades 3 - adult)

Most people know little about mosquitoes except that they bite, yet they are fascinating creatures to study, easy to raise, and readily available. Mosquitoes is a resource book of information and experiments to help anyone who is interested to find out more about them. The book contains information on raising mosquitoes, some ideas for experiments to try, and descriptions of experiments scientists have performed on mosquitoes. There also is a list of materials for raising mosquitoes and information on sources of mosquito eggs. Printed Matter: Resource book.

10. MUSICAL INSTRUMENT RECIPE BOOK (Grades K - adult)

Making musical instruments combines craftsmanship with exploring the physical properties of devices that produce sound. This resource book contains illustrated instructions for making over twenty stringed, wind, and percussion instruments from inexpensive, readily available materials. It can be used as a construction manual and as a source of ideas for building original instruments. Printed Matter: Resource book.

11. OPTICS (Grades 5-8)

This unit provides materials with which students can observe and analyze many of the interesting properties of light by direct experiment. They look at light itself and its interaction with transparent objects, and with things that act as mirrors. The activities are grouped into three main sections: in the first, children explore aspects of reflection and some of the properties of shadows. They then go on to look at colored light, working with colored beams to create a variety of light mixing effects. The third group of activities is concerned with refraction of white and colored light by liquids. Equipment: Light source, mirrors, containers, colored filters. Printed Matter: Teacher's guides.

12. SINK OR FLOAT (Grades 2-7)

This unit offers children experiences with displacement of volumes of liquid and with buoyancy. The activities are intended to help provide a base upon which a more formal conception of the density of materials can be built. By working with materials of different densities, and by varying densities - as by adding Plasticine to a solid object or salt to water, it becomes apparent that an object's ability to float in a given liquid is a property not of the object alone, but of both the object and the liquid. Equipment: Containers, Plasticine, materials of different densities, salt. Printed Matter: Teacher's guide.

13. STARTING FROM SEEDS (Grades 3-7)
In this unit, children are given seeds and vermiculite and containers in which to grow them. Numerous questions arise immediately - which way should we plant the seeds? How deep? Will they grow in the dark? The need for controlled experiments, record keeping, and repeating experiments arises naturally. Equipment: Various types of seeds, containers, vermiculite, slides. Printed Matter: Teacher's guide.

14. WATER FLOW.
This unit takes advantage of the natural appeal of water play to enable children substantially to improve their insight into water flow in closed systems. Students construct their own water systems in vertical support frames, from plastic tubing, tubing connectors, and water bottles. The unexpected behavior of the water, a desire to make the water follow a different path, questions about their designs, or a new piece of apparatus prompts children to make changes. Equipment: Vertical support frames for water systems, plastic tubing, tubing connectors, water bottles. Printed Matter: Teacher's guide, sets of problem cards, map cards (3) and recipe cards (15).

15. WHISTLES AND STRINGS (Grades 4-5)
Working with materials that produce sounds of definite pitch - such as stiff and flexible plastic tubing, straws, and different kinds of string - children explore the relationship between objects and the sounds they make. By altering and combining these and other materials, they investigate the physical conditions necessary to produce sounds, and to change the pitch, volume, and tone quality of sounds. Equipment: Plastic tubing, straws, various types of string, scrap wood. Printed Matter: Teacher's guide.

L. MATERIALS AVAILABLE FREE: Brochure describing ESS (Introduction to ESS -- limited to 20 copies), reprints of several articles, Newsletter which is published irregularly and sent to mailing list. Upon request, interested institutions, scientists, or educators are added to this mailing list.

M. MATERIALS PURCHASABLE: Price list and catalog available from Webster Division, McGraw-Hill Book Company, Manchester Road, Manchester, Missouri 63011.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Some units have been translated into Spanish and French. Arrangements for translations are made by McGraw-Hill Book Company.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Unknown.
2. Number of students involved: Unknown.
3. Number of schools involved: Unknown.
4. Total number of teachers using any of the materials: Unknown.
5. Total number of students using any of the materials: Unknown.
6. Name and location of selected schools where the course is being taught: Many schools in the following communities are involved in using ESS units developed so far (ESS prefers not to have it called a course since they are not involved in the development of a sequential curriculum): Jefferson County, Colorado; San Diego, California; Dixie School District, San Rafael; Greece Central, Rochester, New York; Wellesley, Massachusetts; Stoughton, Massachusetts; Lexington, Massachusetts; Belmont, Massachusetts; Portland, Oregon; Minneapolis, Minnesota; Orange, New Jersey; Cardozo Model School District, Washington, D.C.; Lompoc, California; Abington, Pennsylvania. This is only a partial list, names of additional schools using ESS materials can be obtained by writing to ESS.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Regional consultant's names will be provided on request. The Webster Division of McGraw-Hill Book Company also has a science consultant service.
2. Activities conducted for pre-service and in-service teacher training: In-house workshops for pre-service, and in-service teachers are held in Newton periodically during the academic year (see ESS Newsletter for future dates). Regional Implementation Workshops were held in the summers of 1968 and 1969 and are planned in 1970.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: Available from ERIC Information Analysis Center for Science Education, Columbus, Ohio.
3. Brief abstract of in-house or unpublished research: Contact Frank Watson/ESS for information pertaining to a

documentation study carried on during the 1969-70 school year.
4. Additional evaluative data available to interested individuals: Evaluation instruments and information available from ESS.

T. PROJECT PUBLICITY:
1. Hawkins, David, "Messing About in Science", Science and Children, Feb., 1965.
2. Hein, George E., "Children's Science is Another Culture", Technology Review, December, 1968.
3. Hawkins, David, "The Informed Vision: An Essay on Science Education", Daedalus.
4. Zacharias, Jerrold R., "What's Ahead in Elementary Science" Instructor, Jan., 1967.
5. Rice, Michael, "Water Flow", Science and Children, December, 1969.
6. Rogers and Voelker, "Programs for Improving Science Instruction in the Elementary School, Part I, ESS", Science and Children, Jan., Feb., 1970.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Special emphasis has been given to completing commercial editions of units. Twelve In-house Workshops have been conducted in Newton for school administrators and other groups. Summer workshops for the development of regional workshop leaders were held in 1968 and 1969.

V. PLANS FOR THE FUTURE: ESS is finishing up its development of units. All the units will be in the hands of the commercial publisher by September 1970. A Summer Workshop for the development of teams of regional workshop leaders will be held during the summer of 1970. After September 1970, ESS will maintain a small staff to assist schools and teachers planning to use and implement ESS materials.

A. PROJECT TITLE: ERC SCIENCE PROGRAM.

B. PROJECT DIRECTOR: Dr. James Joseph Gallagher, Director, ERC Science Program, Educational Research Council of America, 312 Rockefeller Building, 614 Superior Avenue, N.W., Cleveland, Ohio 44113. (216)696-8222, Ext. 265.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Offices and demonstration laboratories at the project headquarters. Schools affiliated with ERC provide classroom laboratories for tryout of experimental materials. These schools as of February 1, 1970 are: Aurora, Ohio; Avon Lake, Ohio; Bay Village, Ohio; Berea, Ohio; Bradford, Penna.; Brockton, Massachusetts; Brooklyn, Ohio; Catholic Schools, Cleveland Diocese; Chardon, Ohio; Cuyahoga Heights, Ohio; Fairview Park, Ohio; Independence, Ohio; Lakewood, Ohio; Lutheran Schools, Cleveland, Ohio; Mayfield, Ohio; Mifflin, Ohio; Muskegon, Michigan; Niles, Michigan; North Olmsted, Ohio; Olmsted Falls, Ohio; Owatonna, Minnesota; Summit, New Jersey; Westlake, Ohio; Wickliffe, Ohio.

D. PRINCIPAL PROFESSIONAL STAFF: James Joseph Gallagher, Director; Paul Holobinko, Research Associate; Fred A. Rasmussen, Research Associate; Victor M. Showalter, Research Associate; Daniel D. Itschner, Jr., Research Assistant.

E. PROJECT SUPPORT:
1. Organizational agency: Educational Research Council of America.
2. Funding agency: None particularly designated for science.

F. PROJECT HISTORY:
1. Principal originators: George H. Baird, President and Executive Director of ERC, and Ted F. Andrews.
2. Date and place of Initiation: 1966; Cleveland, Ohio.
3. Overall project purpose: Science curriculum research and development, grades K-12.

G. PRESENT COMMERCIAL AFFILIATIONS: ERC Life Science Program to be published by Houghton Mifflin Company, Boston, Massachusetts.

H. PROJECT OBJECTIVES: The aim of the Science Department of the Educational Research Council of America (ERC) is the improvement of education in the sciences for all elementary and secondary school students. In moving toward this aim, the science staff of ERC is working to build an articulated kindergarten through grade 12 curriculum based upon a program of research and development. Present plans for the ERC Science Program consist of efforts toward:

1. Developing and assembling instructional materials for an articulated curriculum in science for all children.
2. Assisting school personnel in planning for and implementing improved instruction in science consistent with the contemporary goals of science education.
3. Designing and conducting programs to aid teachers in implementing new instructional approaches.
4. Conducting research in science education.

Objectives are stated in The ERC Science Program, a brochure describing the philosophy and goals of the program.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups, Computer assisted instruction, Individualized pacing, Audio-tutorial instruction, Simulations, Games.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Life Science Program - Grade 7; Science Problems - Grades 11, 12, students who do not take physics and chemistry.

K. MATERIALS PRODUCED:

1. ERC Life Science is a program in the biological sciences in which the behavior of man in relation to his environment is a focal point of study. Student investigations include variation, similarities and differences between man and other organisms, the significance of man's interactions with his physical and biological environment, and the complexity of biological problems. Each topic is explored through a series of laboratory-based investigations in which students and their teachers work together to formulate questions, collect data to help in answering them and make interpretations of these data. A unique feature of ERC Life Science is the use of simulation to acquaint students with some of the complex problems man has created since becoming the dominant organism in the earth's environment. The simulations and games deal with major environmental problems such as pollution of air and water; thermal pollution; planetary resources, food supply and population; and land utilization in an increasingly crowded planet. The Life Science sequence has been tested by more than fifty teachers in schools affiliated with ERC, and is now being prepared for publication by Houghton Mifflin Company.
2. ERC Science Problems is a laboratory science course specifically designed for students in grades 11 and 12 who do not ordinarily elect physics and chemistry. A unique feature of Science Problems is its individualized structure and pacing. The course is organized into three sequential phases that differ in content and approach. The principal purpose of Phase I is to introduce students to the processes and skills needed to conduct scientific inquiry. In Phase I the teacher and the class members work together to conduct investigations dealing with the pulse rate. Phase II helps to complete the

transition from teacher-directed inquiry to student-directed inquiry. In Phase II the class members study the movement of pendulums, while the teacher's role becomes less directive and more consultative. In Phase III, which occupies the principal part of the year, individual students carry on independent scientific investigations. Each class member conducts semi-structured investigations chosen from nine available problem areas. In this phase, the teacher's role is that of a consultant and manager for the student's research. Science Problems is now being tested in more than sixty classrooms. Data provided by field trial teachers and their students will serve as the basis for subsequent improvement of this program.

3. Instruments for evaluating students' attitudes and knowledge of science processes.*
4. The ERC Science Program, a brochure describing the goals and philosophy of the program.
5. ERC Papers in Science Education*
   a. A Broader Base for Pre-College Science Teaching by James Joseph Gallagher.
   b. New Directions for Science Curriculum Development by Victor M. Showalter.
   c. Test Every Senior Project: Design and Preliminary Analysis by James Joseph Gallagher.
   d. Test Every Senior Project: Understanding the Social Aspects of Science by Willard W. Korth.
   e. Test Every Senior Project: Evidence of Cognitive Processes Related to Science by Frank E. Nardine.
   f. Test Every Senior Project: Attitudes of Seniors Concerning Science by James Joseph Gallagher and Williard W. Korth.
   g. Test Every Senior Project: Acculturation, Achievement, and Aspirations of Catholic High School Seniors by Sister Mary Clare Jerdonek, V.S.C.
   h. A Model for the Structure of Science by Victor M. Showalter.
   i. A Pre-Scientific Study of Interactions in Selected Classes by James Joseph Gallagher.
   j. Matching Laboratory Activities with Behavioral Objectives by Frederick A. Rasmussen.
   k. A Comparison of Audio-Tutorial and Teacher-Directed Instruction in Science: Effects on Third Grade Pupils by James Joseph Gallagher.
   l. The Promise of Unified Science Education by Victor M. Showalter.
6. Prospecti*
   a. ERC Life Science.
   b. Simulations and Games for ERC Life Science.
   c. ERC Science Problems.

* Single copies available free upon request.

L. MATERIALS AVAILABLE FREE: 3, 4, 5, *6
ERC Science Program, Educational Research Council of America,
312 Rockefeller Building, 614 Superior Avenue, N.W., Cleveland,
Ohio 44113.

*Request papers by title.

M. MATERIALS PURCHASABLE:

1. ERC Life Science Materials - Grade 7.

Variation-Instructional Guide.	$10.60
Characteristics of Living Things-Instructional Guide.	6.90
The Role of Living Things-Instructional Guide	7.50
Man's Effect on the Environment-Instructional Guide	5.90
Set of four topics, Instructional Guides, above	26.50
Variation-Student Investigations	3.20
Characteristics of Living Things-Student Investigations.	2.70
The Role of Living Things-Student Investigations.	2.20
Man's Effect on the Environment-Student Investigations.	1.60
Set of four topics, Student Investigations, above.	7.50
Fly Facts (to accompany Characteristics of Living Things-Instructional Guide).	.70
A Simulated Problem: A Pollution Game (an integral part of Man's Effect on the Environment).	11.70

2. ERC Science Problems Materials - Grade 11 and 12

A Sample Set consists of:	19.10

Phases I & II:
- 1 Teacher Guide to Heartbeat & Pendulum Problems.
- 1 Student Guide to Heartbeat & Pendulum Problems.
- 1 Student Test Packet (Pendulum Checkpoint Tests).
- 1 Heartbeat Problems Resource Book.
- 1 Pendulum Problems Resource Book.
- 1 Flowcharting.

Phase III:
- 1 Problem Area Selected from the list of Phase III Problem Areas (Please indicate choice)

Classroom Set (for 30 students includes a recommended minimum of four of the ten Problem Areas)	$466.40

A Classroom Set for 30 students consists of the following:

Phases I & II:

1 Teacher Guide to Heartbeat & Pendulum Problems.
30 Student Guide to Heartbeat & Pendulum Problems.
30 Student Test Packet (Pendulum Checkpoint Tests).
30 Heartbeat Problems Resource Book.
30 Pendulum Problems Resource Book.
30 Flowcharting:

Phase III:
4 Problem Areas selected from the list of Phase III Problem Areas (Please indicate choices).

Individual Titles for replacement or quantities in addition to Classroom and Sample Sets.

Phases I & II:

Teacher Guide to Heartbeat & Pendulum Problems	5.30
Student Guide to Heartbeat & Pendulum Problems	3.80
Student Test Packet (Pendulum Checkpoint Tests)	1.10
Heartbeat Problems Resource Book	3.80
Pendulum Problems Resource Book	3.80
Flowcharting	1.10

Phase III Only (Problem Area Classroom and Sample Sets, and Resource Books)

Behavioral Science	Classroom Set	53.00
	Sample Set	11.70
	Resource Book Only	3.20
Chemical Analysis	Classroom Set	53.00
	Sample Set	11.70
	Resource Book Only	3.20
Chromatography	Classroom Set	53.00
	Sample Set	11.70
	Resource Book Only	3.20
Electricity	Classroom Set	53.00
	Sample Set	11.70
	Resource Book Only	3.20
Measuring Stars	Classroom Set	53.00
	Sample Set	11.70
	Transit Kit	.30
	Resource Book Only	3.20
Photography	Classroom Set	53.00
	Sample Set	11.70
	Camera Kit	4.30
	Camera Kit (set of 5)	14.90
	Resource Book Only	3.20
Plant Growth	Classroom Set	53.00
	Sample Set	11.70

	Resource Book Only	3.20
Slotcar Science	Classroom Set	53.00
	Sample Set	11.70
	Resource Book Only	3.20
Survival	Classroom Set	53.00
	Sample Set	11.70
	Resource Book Only	3.20

Order Department, Educational Research Council of America,
Rockefeller Building, Cleveland, Ohio 44113.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None planned.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
Prototype units for intermediate grade science.
Simulated experiments for secondary school science.

Q. PROJECT IMPLEMENTATION:

Life Science Materials

1. Number of teachers who have adopted the entire course: 61.
2. Number of students involved: 5656.
3. Number of schools involved: 15.
4. Total number of teachers using any of the materials: 61.
5. Total number of students using any of the materials: 5656.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Definitive.
7. Name and location of selected schools where the course is being taught: Avon Lake, Ohio; Bay Village, Ohio; Berea, Ohio; Bradford, Pennsylvania; Brockton, Massachusetts; Catholic Schools, Cleveland Diocese; Chadron, Ohio; Independence, Ohio; Lakewood, Ohio; Lutheran Schools, Cleveland, Ohio; Mayfield, Ohio; Niles, Michigan; North Olmsted, Ohio; Olmsted Falls, Ohio; Summit, New Jersey.

Science Problems Materials

1. Number of teachers who have adopted the entire course: 25.
2. Number of students involved: 1181.
3. Number of schools involved: 12.
4. Total number of teachers using any of the materials: 25.
5. Total number of students using any of the materials: 1181.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Definitive.
7. Name and location of selected schools where the course is being taught: Aurora, Ohio; Avon Lake, Ohio; Bay Village, Ohio; Berea, Ohio; Bradford, Pennsylvania; Brockton, Mass.; Catholic Schools, Cleveland Diocese; Lutheran Schools, Cleveland, Ohio; Muskegon, Michigan; Niles, Michigan; Summit,

New Jersey; Wickliffe, Ohio.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Consultant services are available free to schools affiliated with the Educational Research Council of America. Limited services to non-affiliated schools are available at a pre-arranged cost.

2. Activities conducted for pre-service and in-service teacher training: Week-long workshops are held during the summer months to orient teachers to new programs in science that have been produced at the Educational Research Council of America and elsewhere. Cost: $25 for teachers in affiliated schools, $100 for others. One day seminars are held periodically during the year to acquaint school staff members with new developments in science education. Cost: $5 for teachers in affiliated schools, $25 for others.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Slide-tape presentations on Science Problems are available on a short-term loan basis.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies: See Section K. 5.

3. Brief abstract of in-house or unpublished research: Data available on trial of Life Science and Science Problems courses. Studies in progress on impact of Science--A Process Approach, Life Science and Science Problems on students' knowledge and attitudes. Other studies include an examination of the effects of simulated experiments in science and audio-tutorial instruction.

4. Additional evaluative data available to interested individuals: Data available on request when preliminary analysis is complete.

T. PROJECT PUBLICITY:

1. Ted F. Andrews, "The ERC Science Program", ERC Science News, Volume 1, Number 1, October 1967.

2. Robert C. Goodman, "ERC Introduces Science Problems Course", ERC Science News, Volume 1, Number 1, October 1967.

3. James Joseph Gallagher, "Staff Plans Research to Study Effects of Science Problems", ERC Science News, Volume 1, Number 3, February 1968.

4. James Joseph Gallagher and Willard W. Korth, "Research Program Explores Impact of ERC Life Science", ERC Science News, Volume 1, Number 4, April 1968.

5. Willard W. Korth, "Proposed Research Plans for ERC Science Programs", ERC Science News, Volume 2, Number 2, December 1968.

6. Claude W. Gatewood, "Questions and Answers about the ERC Science Program", ERC Science News, Vol. 2, No. 3, February 1969.

7. Willard W. Korth, "Research Reported on Test Every Senior Project", ERC Science News, Volume 2, Number 4, April 1969.
8. John S. Heck, "Baltimore County, Maryland, Uses ERC Life Science Materials", ERC Science News, Volume 2, Number 5, June 1969.
9. See also "Curriculum Development Reports" in each ERC Science News.
10. Claude Gatewood, "The Science Curriculum Viewed Nationally," The Science Teacher, Volume 35, Number 8, November 1968.
11. Fred A. Rasmussen, "Science Teaching and Academic Gaming", The American Biology Teacher, December 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:

Life Science program has been revised, tested, and prepared for publication by Houghton Mifflin Company, Boston, Massachusetts. First experimental edition of Science Problems has been completed and is being tested in about fifty classrooms. A survey of the knowledge and attitudes related to science has been completed on nearly 14,000 seniors in sixty-three high schools affiliated with ERC. Eight tests were randomly assigned to the student population. These were:

Iowa Tests of Educational Development--Test 2.
General Background in the Natural Sciences, Form Y-3S.
Test on Understanding Science, Form W.
Processes of Science Test, Form A.
Test on the Social Aspects of Science.
Iowa Tests of Educational Development--Test 6
Interpretation--Natural Sciences, Form Y-3S.
Watson-Glaser Critical Thinking Appraisal, Form ZM.
Science Attitude Scales.
Thinking Creatively with Pictures, Booklet B, and
Thinking Creatively with Words, Booklet B.

A data bank has been established and preliminary analysis has been completed.

V. PLANS FOR THE FUTURE:

Revision and publication of Science Problems.
Further research on the impact of this course on students of lesser ability.
Development and testing of interdisciplinary science instructional modules for middle school students.
Continuing development of cooperative projects with teachers in cooperating schools.

A. PROJECT TITLE: FOUNDATIONAL APPROACHES IN SCIENCE TEACHING (FAST).

B. PROJECT DIRECTOR: Dr. Francis M. Pottenger, Director of FAST Project, Assistant Professor, University of Hawaii, 1776 University Avenue, Honolulu, Hawaii 96822. 944-8563.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: University of Hawaii Laboratory School FAST Project classes as in session and the Hawaii Curriculum Center Development Laboratory.

D. PRINCIPAL PROFESSIONAL STAFF: Project Director, Dr. Francis M. Pottenger; Director of Physical Science Strand, Dr. L. Reed Brantley; Director of Ecology Strand, Sister Edna Demanche, Ph.D.; Director of Relational Study Strand, Dr. Francis M. Pottenger. Contributing Writers and Consultants: Dr. J. Arthur Campbell, Harvey Mudd College, Claremont, California; Mrs. Iris Fukui, Chemistry, University of Hawaii; Dr. John Hendrickson, Marine Zoology, University of Arizona; Mr. Will Kyselka, Geology, University of Hawaii; Dr. J. Adin Mann, Chemistry, University of Hawaii; Dr. Edwin A. Phillips, Ecology, Pomona College, Pomona, California; Mr. Saul Price, Regional Climatologist, University of Hawaii; Dr. Martin Schein, Ecology, University of West Virginia; Dr. Barbara Siegel, Microbiology, University of Hawaii; Dr. Sanford Siegel, Exobiology, University of Hawaii; Dr. Jimmie B. Smith, Genetics, University of Hawaii; Dr. John Winnie, Philosophy of Science, University of Hawaii.

E. PROJECT SUPPORT:
1. Organizational agencies: University of Hawaii Curriculum Center and the Hawaii Science Curriculum Council.
2. Funding agencies: University of Hawaii and National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Hawaii Science Curriculum Council and Science Faculty of the Hawaii Curriculum Center.
2. Date and place of Initiation: June 1967; Hawaii Curriculum Center, University of Hawaii Laboratory School.
3. Overall project purpose: To develop a sequential science program for grades 7, 8, and 9 for the intermediate schools of Hawaii which would articulate with existing courses and provide a background in physical, earth, and biological sciences emphasizing the ecology of the Hawaiian archipelago.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Foundational Approaches in Science Teaching (FAST) is designed to be a three-year sequential laboratory and field-centered science program for grades 7-9 which develops an understanding of foundational concepts and methodologies of the physical, earth, and biological sciences and relates these to the issues of man's manipulation and use of his environment. It articulates with science curricula in both the elementary and high school and is intended for use in a foundational education curriculum, thus is appropriate for both terminal and continuing science education. FAST capitalizes on certain positive developmental factors peculiar to the period of early adolescence. Evidence points to the fact that this is a time when students gain the ability to grapple with the abstract, a time when the basic concepts of science can be programmatically introduced for rediscovery, and a time when the students are able to enter into bonafide scientific inquiry and reflect on their activities. Throughout the FAST program the student is asked to play a triple role. He operates first as a scientist, laboring at the tasks of inquiry and generalization. Then he steps out of this role to assume the stance of the philosopher reflecting on the nature of scientific inquiry and its place in the larger social context. Finally, he takes the role of a member of society who ponders the impact of scientific and technological change and develops ways of coping with problems. This pause to contemplate on the kind and quality of knowledge that a science generates gives the student a more nearly complete frame of comprehension into which he can fit the achievements and implications of science that he will know in his lifetime.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups, Field study.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Subjects: Chemistry, physics, ecology (covering both biological and earth sciences), and philosophy of science. Grades: 7, 8, and 9. Ability Level: Normal enrollment of intermediate school.

K. MATERIALS PRODUCED:
1. Outlines for 7th, 8th, and 9th grade materials.
2. Student laboratory and field materials for grade 7.
3. Teacher's guide for grade 7.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
Student laboratory and field materials for 8th and 9th grades.
Teacher's guides for 8th and 9th grades.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: None.
2. Number of students involved: None.
3. Number of schools involved: None.
4. Total number of teachers using any of the materials: Course materials are not completed; however, 7th grade materials will be used by 24 public and private school teachers in the Fall of 1970. To date, nine teachers have used these materials in the University of Hawaii Laboratory School.
5. Total number of students using any of the materials: In the Fall of 1970, approximately 2,200 students will use the materials. To date approximately 120 have been involved in the University of Hawaii Laboratory School.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: University of Hawaii Laboratory School. Field trials will begin in the Fall of 1970 in the intermediate public schools of the Windward District of the Island of Oahu and in the intermediate classes of the Catholic Schools of Oahu and in Our Redeemer Lutheran School of Honolulu.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: During field trials beginning Fall 1970, a field supervisor will make regular contacts with all trial schools and set up bi-monthly feedback sessions.
2. Activities conducted for pre-service and in-service teacher training: In-service training for field-trial teachers will include a 6 week summer training period at the Hawaii Curriculum Center.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION: Feedback from staff visitations and conferences will be used in evaluation during the academic year from 1970-71.

T. PROJECT PUBLICITY: None.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

7th and 8th grade materials will be completed by the Summer of 1971.

7th grade materials will be refined for the 1971-72 school year.

8th grade materials will be used by the cooperating intermediate schools during the 1971-72 school year.

8th grade materials will be refined for the 1972-73 school year.

9th grade materials will be used by the cooperating schools during 1972-73 school year.

9th grade materials will be refined for the 1973-74 school year.

A. PROJECT TITLE: THE GREATER CLEVELAND MATHEMATICS PROGRAM OF THE EDUCATIONAL RESEARCH COUNCIL OF AMERICA.

B. PROJECT DIRECTOR: Mr. John F. Mehegan, Director, Greater Cleveland Mathematics Program, The Educational Research Council of America, Rockefeller Building, 614 Superior NW, Cleveland, Ohio 44113. (216)696-8222, Ext. 241.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Classes in participating schools.

D. PRINCIPAL PROFESSIONAL STAFF: John F. Mehegan, Director; William T. Hale, Assistant Director; S. Edwin Humiston, K-8 Coordinator; Rae Marie Creps, Research Associate; Ronald P. Fisher, Research Associate; Lucille McCraith, Research Associate; Juris Raudins, Research Assistant; Barrett Robinson, Research Assistant; Margaret Russell, Research Associate; Sharon Thompson, Research Assistant; Max Beberman, Consultant; Charles Buck, Consultant; George S. Cunningham, Consultant; Jack E. Forbes, Consultant; John G. Kemeny, Consultant; George Polya, Consultant.

E. PROJECT SUPPORT:
1. Organizational agencies: Not answered.
2. Funding agencies: Grant Foundation, Martha Holden Jennings Foundation, Charles F. Kettering Foundation, Lubrizol Foundation, and others.

F. PROJECT HISTORY:
1. Principal originator: Dr. George Baird, The Educational Research Council of America, President.
2. Date and place of Initiation: March, 1959; Cleveland, Ohio.
3. Overall project purpose: To develop a comprehensive, sequential mathematics program for all children in grades kindergarten through twelve, a program which is both mathematically correct and pedagogically sound.

G. PRESENT COMMERCIAL AFFILIATIONS: Some of the materials are published by Science Research Associates, Inc., in Chicago, Illinois.

H. PROJECT OBJECTIVES: The objectives of the program are: to develop the ability to interpret new situations, investigate new questions, and solve new problems; to develop skillful computation; to maintain the natural curiosity of the young child; to develop the ability to solve problems by perceiving pattern and structure in mathematical situations; to increase computational skill through an understanding of the structure of the number system; to extend understanding of number to include irrational numbers; to develop an understanding of graphing and skill in the use of graphs. At the elementary level, the GCMP uses an intuitive approach to the logic and structure of mathematics. At the secondary level, the approach is more formal. The entire program stresses the use of guided discovery techniques. Learning to discover pattern and structure develops an analytic power that is invaluable in solving problems. Objectives are stated in the GCMP brochure entitled "The Greater Cleveland Mathematics Program".

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups, Computer assisted instruction, Films.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Kindergarten-sixth grade (elementary); pre-algebra for grades 7, 8; basic math for 10, 11 (less able students); computers in the schools (7-12).

K. MATERIALS PRODUCED:

1. Kindergarten Work Sheets and Teacher Guide, Volume 1 and 2.
2. Primary Series, Grades 1-3, Pupil Books and Teacher Guides.
3. Intermediate Series, Grades 4-6, Pupil Books and Teacher Guides.
4. Assignment Guides for K-6 (Available only to Council Schools).
5. Learning Activity Books (Available only to Council Schools).
6. Pre-Algebra Program: 101, 102A, 102B, 102C, 103, 104, 105, 201, 201S, 203, Teacher Guides and Pupil Books; Looping Books: N-1, N-2, N-3, F-1, F-2, F-3, J-1, J-2, J-3, FJ4, P-1, P-2, G-1, G-2, G-3, Teacher Guides and Pupil Books.
7. GCMP Geometry (Books 1-4 with Teacher Guides).
8. Basic Math Program: Constructions, Congruence, Similarity, Geometrical Drawing, Circles, Boxes and cylinders, Measurement, Right Triangles, Divisors, D= mn, Linear Trends.
9. Computers in the Schools Program: A BASIC Primer and Elementary Functions with BASIC - Teacher Guides and Pupil Books.
10. Bulletins - "What Good Teaching Does"; "Have You Done Your Homework?"; "GCMP Pre-Algebra Program"; "Greater Cleveland Mathematics Program"; "GCMP Elementary."
11. Diagnostic and Placement Inventories.

L. MATERIALS AVAILABLE FREE:
"GCMP Pre-Algebra Program"; "Greater Cleveland Mathematics Program"; "GCMP Elementary."
Available from the Educational Research Council of America, Department of the Greater Cleveland Mathematics Program.

M. MATERIALS PURCHASABLE: Items 1, 2, and 3 available from Science Research Associates, 259 East Erie St., Chicago, Illinois 60611.

Item 6, Pre-Algebra materials, Item 7 GCMP Geometry - Student Books (Set of 4 books $6.00), Teacher Guides (Set of 4, $10.50), Item 8, Basic Math materials, Item 9, Computers in the Schools materials, Item 10, "What Good Teaching Does" $ .50 and "Have You Done Your Homework?" $ .25 are all available from the Educational Research Council of America, Rockefeller Building, 614 West Superior Avenue, Cleveland, Ohio 44113. An order form will be sent upon request for Items 6, 8, and 9.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Elementary Algebra with BASIC. Additional books for the less able tenth and eleventh graders.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers using some or all of the materials in Council schools: 2,230.
2. Number of students involved: 69,671 (Council schools).
3. Number of schools involved: 175 (Council schools).
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: State of Ohio: Aurora, Avon Lake, Bay Village, Berea, Brooklyn, Cleveland Catholic Schools, Chardon, Fairview Park, Cuyahoga Heights, Independence, Lakewood, Lutheran (Cleveland Schools), Mayfield, North Olmsted, Olmsted Falls, Westlake, Wickliffe. Out of state schools: Bradford (Penna.), Brockton (Massachusetts), Muskegon (Michigan), Niles (Michigan), Owatonna (Minnesota), Summit (New Jersey).

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: The GCMP staff is available at all times to conduct workshops at individual schools, to give demonstration lessons, and to help the individual teacher implement the GCMP or other programs.
2. Activities conducted for pre-service and in-service teacher training: Summer conferences (3 day workshop for both experienced and new GCMP teachers); 1 day fall workshops (for experienced GCMP teachers who did not attend the summer workshop); 1 day spring workshops (for experienced and new GCMP teachers); provide visitation to schools, consultant and demonstration lessons during the school year. A fee is charged for the workshops and usually paid for the teachers by the schools.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies: Not answered.

3. Brief abstract of in-house or unpublished research: Currently, the GCMP staff is working on a Basic Math Research Project (less able student). The purpose of this research project is to: (a) determine whether the stated objectives of each booklet can be achieved with students who are not taking college preparatory mathematics. (b) determine whether student attitude towards mathematics can be improved. (c) determine whether student attitude towards school can be improved. During the 1969-70 school year, the project will concentrate on Objective 1. In 1969 two sections of the Greater Cleveland Mathematics Diagnostic and Placement Inventory (DPI) were used to measure the students' performance. One measured understanding of concepts and computational skill for rational numbers. The DPI is being developed as an integral part of the pre-Algebra program. Therefore, its language and style is consistent with the materials which the students have used. In general the results of this study show that exposure to Book 102-C, rational numbers from the GCMP pre-Algebra program has a positive effect on the performance of students in rational numbers concepts and computation. An additional effect is the fact that those students exposed to this book also increased the level of their performance on fractional numbers concepts and computation. A study was done in 1966 to investigate two teaching methods of whole number multiplication--a new approach developed by the GCMP staff, and the original approach in the Third Grade GCMP. The study covered an 8-week period. Two pretests on multiplication, a omputation test and a concepts test, were given to the experimental and the control groups at the beginning of the experiment. The two groups were comparable on their ability in multiplication as measured by these tests. No significant difference was found on their I.Q. either. At the end of the experiment, the same tests were given to the two groups. The experimental group could compute significantly better than the control group, particularly in problems which dealt with facts, 2-digit x 2-digit and 3-digit x 2-digit. Although the experimental group also led in concepts, the difference was not statistically significant. In terms of growth, the results were again in favor of the experimental group. The significance of the difference in the growth in computation was beyond the .01 level, and the significance of the difference in the growth in concepts approached the .05 level. A report was done in 1965 based on data collected from the administration of the Stanford arithmetic tests (1964 edition) to GCMP classes in Grades Four through Six during the week of May 24, 1965. The data indicated that within the framework of the Stanford tests, the GCMP students did better on concepts and application than on computation. Yet they were able to

maintain their computational skills at the level for their grade placement. In this sense, the stress on conceptual understanding in the GCMP was not accompanied by a deficiency in the computational skills.

4. Additional evaluative data available to interested individuals: Write to project director.

T. PROJECT PUBLICITY: None.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Extensive experimental use with various teaching aids. (1968) Revision of K-6. Development of Basic Math Booklets for the less able student program. Development of pupil books and teacher guides for the Computers in the Schools Program.

V. PLANS FOR THE FUTURE:
Continued experimentation and revision.
Field work in Council schools.
Expansion of program for "less able students" in high school.
Additional books relating the computer to the learning of mathematics.

A. PROJECT TITLE: HARVARD PROJECT PHYSICS (HPP).

B. PROJECT DIRECTOR: Executive Director: Dr. F. James Rutherford, Harvard Project Physics, 8 Prescott St., Cambridge, Mass. 02138. (617)868-7600, Ext. 2991. Project Codirectors: Dr. Gerald Holton, Dr. F. James Rutherford, Dr. Fletcher Watson.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Conference room where all printed materials are available for viewing. Audio-visual materials (film loops, 16mm films, transparencies, etc.) may be viewed in the Conference room. Visitors are also invited to visit our laboratory to see Project Physics apparatus.

D. PRINCIPAL PROFESSIONAL STAFF: Harvard Project Physics Codirectors: Dr. Gerald Holton, Dr. F. James Rutherford, Dr. Fletcher Watson. Other principal staff: Dr. Andrew Ahlgren, Dr. Robert H. Maybury, Mr. William K. Mehlbach.

E. PROJECT SUPPORT:
1. Organizational sponsorship: Harvard University Graduate School of Education.
2. Funding agencies: U.S. Office of Education, Carnegie Corporation of New York, The National Science Foundation, The Ford Foundation, The Alfred P. Sloan Foundation.

F. PROJECT HISTORY:
1. Principal originators: Dr. Gerald Holton, Dr. F. James Rutherford, Dr. Fletcher Watson.
2. Date and place of Initiation: July 1964; Cambridge, Mass.
3. Overall project purpose: Development of an introductory physics course for secondary school students.

G. PRESENT COMMERCIAL AFFILIATIONS: Holt, Rinehart and Winston, 383 Madison Avenue, New York, N. Y. 10017; and Damon Engineering/Educational Division, 115 Fourth Street, Needham Heights, Mass.

H. PROJECT OBJECTIVES: (a) The presentation of physics in a broad, humanistic context; to try to show connection between it and man's other intellectual, artistic and social activities. (b) To design into the course the maximum flexibility with regard to context, emphasis, and teaching strategies. This involves considerable change in the prevailing notions about the role of the teacher in science learning. (c) To increase, in numbers and in diversity of ability and interests, the population of students who take an introductory physics course.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Lectures, Seminars, Multi-media approach.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Introductory physics course for high school and junior college students.

K. MATERIALS PRODUCED:

1. 6 basic text units.
2. 6 teacher guides.
3. 6 student handbooks.
4. 6 physics readers.
5. Laboratory and demonstration apparatus.
6. Overhead transparencies.
7. Film loops and film strips.
8. Test booklets.
9. Supplementary Units.
10. Programmed instruction booklets.
11. Newsletters.

L. MATERIALS AVAILABLE FREE: No. 11 - Newsletters available from Harvard Project Physics, 8 Prescott Street, Cambridge, Mass. 02138.

M. MATERIALS PURCHASABLE: Items 1-10, all materials are available from Holt, Rinehart and Winston, 383 Madison Avenue, New York, N.Y. 10017.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: French, Spanish, German, Italian, Swedish, Japanese and others.

P. MATERIALS BEING DEVELOPED: Additional film loops, additional programmed instruction booklets, additional supplemental units.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: In 1969-70, about 400.
2. Number of students involved: In 1969-70, about 5000.
3. Number of schools involved: In 1969-70, about 400.
4. Are the totals stated in 1, 2, and 3 estimated or definitive? Totals taken from information supplied by the teachers.
5. Name and location of selected schools where the course is being taught: List available upon request.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: The staff of Project Physics makes available to teachers, upon request, information pertaining to evaluation of the course and other supporting information likely to

assist a teacher, particularly in connection with enabling school administrators to install the course in a school. The authorized publisher (Holt, Rinehart and Winston) through its network of experienced salesmen, provides considerable support to individual teachers in matters of ordering materials, etc.
2. Activities conducted for pre-service and in-service teacher training: National Science Foundation institutes are open to teachers. These include 14 Summer Institutes in 1970, a large number of inservice institutes in academic year 1970-71, and 4 Cooperative College-School Science Programs. Some school district-supported inservice programs are also underway.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: A packet of teacher training materials suitable for use in inservice courses is being prepared by the Project staff and will be available upon request to Holt, Rinehart and Winston.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: Bibliography of research and evaluation papers is available upon request.
3. Brief abstract of in-house or unpublished research: A volume summarizing results is being readied for press.
4. Additional evaluative data available to interested individuals: Yes, for research, from computer tapes. Write to the Project headquarters.

T. PROJECT PUBLICITY: Not answered.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: See Newsletters.

V. PLANS FOR THE FUTURE: Within the next few years, a junior college version of the course will be available; also additional supplemental units; foreign adaptations; and teacher training programs.

A. PROJECT TITLE: HIGH SCHOOL GEOGRAPHY PROJECT OF THE ASSOCIATION OF AMERICAN GEOGRAPHERS (HSGP).

B. PROJECT DIRECTOR: Dr. Dana G. Kurfman, Director, High School Geography Project, P.O. Box 1095, Boulder, Colorado 80302. (303)447-8150.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Multi-media materials on display at project office in Boulder.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. Dana G. Kurfman, Director; Mr. Robert W. Richburg, Assistant Director; Dr. Ronald J. B. Carswell, Teacher Education Specialist; Mr. Robert M. Cason, Teacher Education Specialist.

E. PROJECT SUPPORT:
1. Organizational agency: Association of American Geographers.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Joint Committee on Education of the Association of American Geographers and National Council for Geographic Education; original funding by Ford Foundation.
2. Date and place of Initiation: September, 1961; Dept. of Geography, University of California at Los Angeles.
3. Overall project purpose: Development of a one-year geography course for students in grades nine through twelve.

G. PRESENT COMMERCIAL AFFILIATIONS: The Macmillan Company, School Division, 866 Third Avenue, New York, New York 10022.

H. PROJECT OBJECTIVES: Development of inquiry and decision making attitudes and abilities; development of concepts applicable in a variety of regions and settings; development of positive attitudes toward school experiences.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, Educational games, Simulations, Role-playing activities, Filmstrips.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: The HSGP course was originally written as a year-long geography course for high school students. Units are available individually and have been used successfully in a variety of social studies courses. Materials have also been used successfully at the junior high level.

K. MATERIALS PRODUCED:

Six - unit year-long course: Geography in an Urban Age

1. Unit 1, Geography of Cities (six to eight weeks teaching time). The highlight of this unit is the involvement of students in building their own city, Portsville. They construct their model city on a modulex board, using colored Lego blocks representing different types of land uses. In other activities within this unit, students learn about factors influencing the location, structure and growth of cities. They also study the sizes and spacing of cities. Students work with many kinds of media, including aerial photographs and topographic maps.
2. Unit 2, Manufacturing and Agriculture (six to eight weeks teaching time). There are two high points of student participation in this second unit. One of these is a role-playing activity in which the class decides where to locate a metal fabricating company (Metfab) in the United States. In the second activity, students assume the roles of farmers in Western Kansas during three different time periods. Students select the crops they will grow. The outcomes of their decisions are affected by chance, as well as natural and economic factors. Included also in this unit are a number of activities dealing with agriculture and manufacturing around the world.
3. Unit 3, Cultural Geography (three to four weeks teaching time). Cultural relativity is the theme of an activity in which students explore different attitudes toward cattle around the world. Sports and Islam are used to illustrate the factors involved in cultural diffusion. French Canada is the basis for a regional boundary activity. The final activity uses a film strip to contrast traditional architecture and modern business districts in cities around the world. Students gain a better idea of how different parts of the world are becoming more similar.
4. Unit 4, Political Geography (four to five weeks teaching time). In one activity students become legislators and interested citizens of a hypothetical state. They face the problem of distributing limited government funds among sections with different needs and interests. Another activity deals with the problem of redistricting a state to assure equal voting representation. Role-playing is also featured in a simulation of an international boundary dispute. Closer to home is an activity in which students face the problems of deciding where the boundaries for a new high school district should be established. A more expository activity uses London as a basis for analyzing problems involved in metropolitan government.
5. Unit 5, Habitat and Resources (six weeks teaching time). The major emphasis of this unit is on the interaction of man and his natural environment. One of the activities compares two areas, the Salton Sea area of California and the Nile Delta, which are very similar in their physical characteristics

but quite different in the way man has modified the natural habitat. Another activity indicates the influence of geographical characteristics on the transportation routes, farming, and settlements of an area. A number of activities focus on problems associated with man's use of his environment. In the final activity, New York City serves as the case study for analyzing the problems of pollution and waste.

6. Unit 6, Japan (three weeks teaching time). Pictures are used to compare Japan and North America, prior to a consideration of traditional and modern aspects of Japanese life. The major part of the unit provides for student investigation of Japan's growth during the past hundred years using data presented in graphic, tabular, and map form. Students try to explain how Japan has been able to modernize so effectively in such a short period of time. Subsequently, the relevance of the Japanese experience for underdeveloped areas is considered.

L. MATERIALS AVAILABLE FREE: Available from HSGP office, Boulder: Subscription to HSGP Newsletter; Brochure, HSGP; American Education reprint, This Geography is Something to Sing About by Catherine Watson.

M. MATERIALS PURCHASABLE: Available from HSGP office, Boulder: Sample Kit of teacher education materials at $1.25 (See R3 for more details)
Reference booklet, Source of Information and Materials: Maps and Aerial Photographs at $1.50.

Available from the Macmillan Company, School Division, 866 Third Avenue, New York, New York 10022:
1. Classroom set of 30: approximately $330.
2. Classroom set of 30: approximately $100.
3. Price not available at this time.
4. Classroom set of 30: approximately $50.
5. Price not available at this time.
6. Price not available at this time.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Teacher education materials for use by both college students in geography and social studies methods classes and by in-service teachers in workshops. Three kits or units of study are now undergoing field trials. A Sample Kit of the materials is available at cost from the Project office. (See R3 for more detail regarding contents of the kits.)

Q. PROJECT IMPLEMENTATION: Information on implementation is not available to us at the present time.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: None at present.

2. Activities conducted for pre-service and in-service teacher training: Five summer institutes in geography will feature HSGP materials in 1970. These institutes are funded by the National Science Foundation.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Three teacher education kits have been developed by the HSGP. They are: Using Simulation to Involve Students; Using Media to Stimulate Inquiry; Using Evaluation to Improve Instruction. The kits are designed for use by both college students in geography and social studies methods classes and by in-service teachers in workshops. Each kit is five hours in length and can be used independently or together with other kits. Each kit is based on the assumption that the best way to learn the advantages and disadvantages of any teaching strategy is to experience it. Consequently, the kits provide many opportunities for participation in the use of a variety of educational media, in role-playing simulations, and in evaluation exercises. Such experiences are subsequently analyzed in terms of their educational objectives and their usefulness in a variety of social studies classrooms. At the conclusion of each kit, participants are given an opportunity to apply what they have learned. Some of the exercises in each of the kits have been adapted from the HSGP course. While these exercises were originally intended for use with high school students, they have also been tried out successfully with numerous adult groups. All materials needed, such as aerial photos, maps, and diagrams are provided in the kits. Video tapes are available from the ACM Video Tape Project, Carleton College, Northfield, Minnesota 55057. A Sample Kit of the HSGP teacher education materials is now available from the Project office at $1.25. The Sample Kit contains an Instructor's Guide and Participant's Manual of Using Simulation to Involve Students as well as a description of each kit.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff and by the Educational Testing Service, Princeton, N. J.

2. Pertinent published research studies: Dana Kurfman, "Improving the New Geography Through Evaluation," The Bulletin of the National Association of Secondary School Principals, Vol. 50, No. 316, February, 1967.

3. Brief abstract of in-house or unpublished research: Evaluation reports have been prepared on each of the units after field testing of the unit.

4. Additional evaluative data available to interested individuals: By contacting the Project office.

T. PROJECT PUBLICITY:

1. Catherine Watson, "This Geography is Something to Sing About," American Education, Office of Education, U.S. Department of Health, Education and Welfare, October, 1969.
2. Nicholas Helburn, "The Educational Objectives of High School Geography," The Journal of Geography, Vol. LXVII, No. 5, May, 1968.
3. Nicholas Helburn, "New Materials and Teaching Strategies," The Bulletin of the National Association of Secondary School Principals, Vol. 50, No. 316, February, 1967.
4. Nicholas Helburn, "Improving Communication Between the Teacher and the Geographer: The Role of the High School Geography Project," The Journal of Geography, Vol. LXIV, No. 4, April, 1965.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:

Completion of HSGP course.
Development of three teacher education kits.

V. PLANS FOR THE FUTURE:

HSGP funds will terminate in September, 1970.

A. PROJECT TITLE: IDEA-CENTERED LABORATORY SCIENCE (I-CLS) SUCCESSOR PROJECT TO THE MICHIGAN CURRICULUM COMMITTEE JUNIOR HIGH SCHOOL PROJECT (MSCC-JHSP).

B. PROJECT DIRECTOR: Dr. W. C. VanDeventer, Professor of Biology (Science Education), Department of Biology, Western Michigan University, Kalamazoo, Michigan 49001. (616)383-4997.

C. PROJECT HEADQUARTERS:

1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Interviews and classroom visits with persons who are using the materials experimentally in schools in the area.

D. PRINCIPAL PROFESSIONAL STAFF: Mrs. Lucille Duyser, Grand Rapids Public Schools, Co-Writer, Middle School Science Consultant, Grand Rapids, Michigan.

E. PROJECT SUPPORT:

1. Organizational agency: Department of Biology, Western Michigan University, Kalamazoo, Michigan 49001.
2. Funding agency: Department of Biology, Western Michigan University.

F. PROJECT HISTORY:

1. Principal originators: Michigan Science Curriculum Committee, State of Michigan, Department of Education. Continued by the present writers as a private project sponsored by the Western Michigan University Department of Biology.
2. Date and place of Initiation: October 1962, Battle Creek, Michigan. Continued as Idea-Centered Laboratory Science (I-CLS) March, 1968, Grand Rapids, Michigan.
3. Overall project initiation: To produce open-ended activity-based, idea-centered materials for junior high school science.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: The general theme of I-CLS is to bring students to understand "the point of view of a scientist and the kinds of things that he does." I-CLS differs from other projects directed toward slow learners at the junior high level in that it is idea-centered, activity-based, reducing the amount of reading required to a bare minimum. Yet, it retains an open-ended, directed discovery approach. It differs from the MSCC-JHSP materials which preceded it in that it is designed to be a structured three-year program with separate Student Materials and Teacher Notes. MSCC-JHSP was unstructured and consisted of materials written for teachers to use in course enrichment. Both projects have the same basic philosophy. The basic philosophy and outline of project structure, basic assumptions, suggested procedure for teaching and testing, and criteria for writing laboratory experiences are all stated in the introduction to the Teacher Notes, for the first unit of I-CLS. A brief account of the history and philosophy of MSCC-JHSP and I-CLS is found also in the reprint *A New Look at Inquiry in Junior High School Science* which is available free.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, some experimentation is being carried on with programmed instruction.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: I-CLS is an integrated science project, drawing materials from both biological and physical sciences as necessary to implement the ideas being taught. The materials presently available are designed for 7th and 8th grades. Materials for 9th grade are in the planning stage. I-CLS is directed toward middle and low reading and ability levels, and also toward the other "reluctant learners" in science.

K. MATERIALS PRODUCED:

1. Michigan Science Curriculum Committee Junior High School Project (MSCC-JHSP) complete report.
2. Idea-Centered Laboratory Science (I-CLS)
    (a) Unit A. How a Scientist Learns About His World.
    (b) Unit B. How a Scientist Behaves Toward His World.
    (c) Unit C. How a Scientist Expects His World To Behave.
    (d) Unit D. The Kind of World a Scientist Thinks He Has Found: He Assumes The Existence of Variation and Change.
    (e) Unit E. The Kind of World a Scientist Thinks He Has Found: He Thinks in Terms of Relationship Rather Than Absolutes.
    (f) Sample Tests.
3. Tentative Outline for Idea-Centered Laboratory Science (I-CLS).
4. A New Look at Inquiry in Junior High School Science.

L. MATERIALS AVAILABLE FREE: 2a, 2b, 2c, 2d, 2e, and 2f (One copy of each free to each correspondent. 3 and 4 (multiple copies free if requested).

M. MATERIALS PURCHASABLE:

1. $2.25 per copy.

Multiple copies of other publications are available at the following prices:

2a.	$ .50 per copy.
2b.	.75 per copy.
2c.	.50 per copy.
2d.	1.00 per copy.
2e.	1.00 per copy.
2f.	.50 per copy.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Negotiations have been carried on for translation of MSCC-JHSP into Spanish and Japanese.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
I-CLS:
1. Unit F. Science Is Limited by How We Feel About the World.
2. Unit G. Science Is Limited by What We Believe About the World.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 30.
2. Number of students involved: 1000.
3. Number of schools involved: 18.
4. Total number of teachers using any of the materials: 100.
5. Total number of students using any of the materials: 3500.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? All figures are approximate, but are based on the best information we have.
7. Name and location of selected schools where the course is being taught: Wantz School, South Sixth Street, Miamisburg, Ohio 45342; Brandywine Junior High School, 2428 South 13th Street, Niles, Michigan 49120; J. Sterling Morton High Schools, 2400 Home Avenue, Berwyn, Illinois 60402; West Irondequoit Central Schools, 370 Cooper Road, Rochester, New York 14617; St. Theresa Junior High School, 4321 Pengree, Detroit, Michigan 48204; Frankfort American Junior High School, Frankfort, Germany, APO New York 09039; Lee Senior Elementary School, 520 West Street, Woodland, California 95695; Bedford Park Teachers College, Adelaide, South, Australia.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: No formal teacher preparation program has been attempted. Simple and brief Teacher Notes accompany the student oriented materials. These are self-explanatory. The writers have visited a number of the schools listed above and have conducted orientation sessions with groups of teachers. The writers ask that their expenses be paid when they do this, but they make no other charge. An extensive correspondence, involving answering "how to do it" questions, is carried on with active co-operators. Co-operators also contribute feedback for the development and revision of the project.
2. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: The materials of MSCC-JHSP and I-CLS (see K above) are available to science educators for use in preparing teachers on the basis indicated in (H) and (M) above.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies:

VanDeventer, W. C. "An Inquiry Approach to Interdisciplinary Seventh Grade Science." Journal of Research in Science Teaching 5:373-384. Issue 4, 1967-1968.

Carnes, Phyllis E., Joseph C. Bledsoe, and W. C. VanDeventer, "Programmed Materials in Seventh-Grade, Open-Ended Laboratory Experiences." Journal of Research in Science Teaching 5:385-396. Issue 4, 1967-1968.

3. Brief abstract of in-house or unpublished research: I-CLS materials have proved effective at the seventh grade level in studies conducted at Hillside Junior High School, Kalamazoo, Michigan, and in less formal studies at other cooperating schools. Significant differences between control groups and experimental groups using the materials are found on standardized achievement tests. Significant differences are also found between pre and post-tests in the teacher-made tests constructed from student questions. It appears that these question tests constitute a valid and quasi-objective means of measuring student attainment of the goal of understanding ideas.

4. Additional evaluative data available to interested individuals: Interested individuals are invited to correspond with the Director concerning evaluation of the I-CLS program.

T. PROJECT PUBLICITY:

1. VanDeventer, W. C., "Michigan Reports Project on Junior High Science". The Science Teacher. 31:29-30, November 1964.
2. Michigan Science Curriculum Committee, Open-Ended, Laboratory-Centered Science for Grades 7-8-9. NDEA Table III, Bulletin No. 313, Department of Public Instruction, Lansing, Michigan, 1965.
3. VanDeventer, W. C., "Michigan Project for Junior High Science." The Science Teacher. 34:30-31 December 1967.
4. VanDeventer, W. C. "The Michigan Science Curriculum Committee Junior High School Project (MSCC-JHSP). Metropolitan Detroit Science Review 29:19-21. 1968.
5. VanDeventer, W. C. "An Inquiry Approach to Interdisciplinary Seventh Grade Science." Journal of Research in Science Teaching. 5:373-384. 1967-1968.
6. VanDeventer, W. C. "A New Look at Inquiry in Junior High School Science." The Science Teachers Bulletin (Science Teachers Association of New York State, Inc.) 35:29-35. Spring 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: The Idea-Centered Laboratory Science (I-CLS) project has been developed as a structured program directed toward student understanding of the point of view of a scientist and the kinds of things that he does. This is a successor project to the Michigan Science Curriculum Committee Junior High School Project (MSCC-JHSP) which was unstructured and consisted of teacher-directed enrichment materials.

V. PLANS FOR THE FUTURE: It is planned that revision of I-CLS Units A, B, C, D, and E on the basis of feedback from cooperating schools to meet possible publisher requirements will occupy most of 1970. The writing of Units F and G, will probably be attempted in 1971. Publication of descriptive and research articles based on use of the materials will be continued.

A. PROJECT TITLE: IDEAS AND INVESTIGATIONS PROJECT (IIS) - AN APPROACH TO SCIENCE FOR THE EDUCATIONALLY UNINVOLVED.

B. PROJECT DIRECTOR: Harry K. Wong, Science Teacher, Menlo-Atherton High School, Atherton, California 94025. (415)369-1411.

C. PROJECT HEADQUARTERS:

1. Contact: Harry K. Wong, IIS Project, 6 Davis Street, Belmont, California 94002. (415)593-1671.
2. Special facilities or activities available for visitor viewing: Visitors welcome at classes at Menlo-Atherton High School or at pilot school classes, by arrangement.

D. PRINCIPAL PROFESSIONAL STAFF: Harry K. Wong, Director; Malvin S. Dolmatz, Associate Director.

E. PROJECT SUPPORT:

1. Organizational agency: None.
2. Funding agencies: Curriculum Development: Sequoia Union High School District, Redwood City, California. Pilot Testing Program: Prentice-Hall, Inc., Englewood Cliffs, N. J.

F. PROJECT HISTORY:

1. Principal originators: Harry K. Wong and Malvin S. Dolmatz.
2. Date and place of Initiation: Originally begun as Project PITS (PROJECT IN TERMINAL SCIENCE) In Fall, 1965; Menlo-Atherton High School, Atherton, California.
3. Overall project purpose: To develop a 1-2 year science program for use in grades 9-12 with low achieving or slower learners.

G. PRESENT COMMERCIAL AFFILIATIONS: Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632.

H. PROJECT OBJECTIVES:

Purposes: To develop a science program for the student who may:

1. come from an economically disadvantaged environment which has caused him to fall behind in school.
2. be disinterested in traditional school activities.
3. come from a different cultural background.
4. find it difficult to learn from traditional methods, like listening to lectures and reading from books.

Objectives: To develop a science program for the educationally uninvolved student that will:

1. stress continued success.
2. be completely laboratory and experimental in nature.
3. derive a continum of concepts from a series of sequentially integrated laboratory investigations.

4. have the major conceptual themes serve as the content framework.
5. involve the student in all of the processes of science as he uncovers each concept.
6. make scientific problems with social implications an integral and relevant part of as many lessons as possible.
7. use examples familiar to the urban and non-white student.

The objectives are further developed in the teacher's guide to the program.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, Sequential laboratory investigations.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: IIS is designed for the students in terminal or slow track courses at grades 9-12. The program can be used in three different ways:
1. A one-year, physical science course.
2. A one-year, biological science course.
3. A one-year, general science course consisting of one semester each in the biological and physical sciences.

K. MATERIALS PRODUCED:
Pilot editions of the following:
1. Prologue - Inquiry, Student edition.
2. Prologue - Inquiry, Teacher's edition.
3. Biology, Idea 1 - Evolution, Student edition.
4. Biology, Idea 1 - Evolution, Teacher's edition.
5. Biology, Idea 2 - Genetics, Student edition.
6. Biology, Idea 2 - Genetics, Teacher's edition.
7. Physical Science, Idea 1 - Matter, Student edition.
8. Physical Science, Idea 1 - Matter, Teacher's edition.
9. Physical Science, Idea 2 - Energy, Student edition.
10. Physical Science, Idea 2 - Energy, Teacher's edition.

L. MATERIALS AVAILABLE FREE: None, except an impending Newsletter. Write to the headquarters for the Newsletter.

M. MATERIALS PURCHASABLE: No pilot materials available. Commercial edition will be available from Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
1. Biology, Idea 1 - Inquiry, Student edition.
2. Biology, Idea 1 - Inquiry, Teacher's edition.
3. Biology, Idea 2 - Evolutionary Change, Student edition.

4. Biology, Idea 2 - Evolutionary Change, Teacher's edition.
5. Biology, Idea 3 - Genetic Continuity, Student edition.
6. Biology, Idea 3 - Genetic Continuity, Teacher's edition.
7. Biology, Idea 4 - Homeostatic Balance, Student edition.
8. Biology, Idea 4 - Homeostatic Balance, Teacher's edition.
9. Biology, Idea 5 - Ecological Interdependence, Student edition.
10. Biology, Idea 5 - Ecological Interdependence, Teacher's edition.
11. Physical Science, Idea 1 - Discovery, Student edition.
12. Physical Science, Idea 1 - Discovery, Teacher's edition.
13. Physical Science, Idea 2 - Matter, Student edition.
14. Physical Science, Idea 2 - Matter, Teacher's edition.
15. Physical Science, Idea 3 - Energy, Student edition.
16. Physical Science, Idea 3 - Energy, Teacher's edition.
17. Physical Science, Idea 4 - Interaction, Student edition.
18. Physical Science, Idea 4 - Interaction, Teacher's edition.
19. Physical Science, Idea 5 - Technology, Student edition.
20. Physical Science, Idea 5 - Technology, Teacher's edition.
21. Various equipment packages to accompany the above.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 27 (pilot program).
2. Number of students involved: 900.
3. Number of schools involved: 21.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: Garfield High School, Seattle, Washington; Washington High School, Portland, Oregon; John F. Kennedy High School, Richmond, California; Locke High School, Los Angeles, California; San Fernando High School, San Fernando, California; Capitol Hill Junior High School, Oklahoma City, Oklahoma; Menlo-Atherton High School, Atherton, California; Cathedral High School, Chicago, Illinois; Gordon Technical High School, Chicago, Illinois; John McDonogh High School, New Orleans, Louisiana; Gorton High School, Yonkers, New York; North Quincy High School, Quincy, Massachusetts.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: A consultant's schedule will be organized for the school year, 1970-71. Interested schools should write to the headquarters and ask to be put on the schedule.
2. Activities conducted for pre-service and in-service teacher training: In-service training was provided for the pilot teachers. An NSF sponsored summer conference will be held at Stanford University from August 9-15.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: A Q-sort exam was administered to all of the students in the pilot program. The data is presently being evaluated.
4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: None.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

1. Making the commercial publication available.
2. Planning pre-service materials.
3. Holding conferences and workshops around the country.

A. PROJECT TITLE: IDENTIFYING BEHAVIORAL OBJECTIVES FOR SCIENTIFIC LITERACY.

B. PROJECT DIRECTOR: Albert F. Eiss, Associate Executive Secretary, National Science Teachers Association, 1201 Sixteenth Street, N. W., Washington, D. C. 20036.
(202)223-9400, Ext. 521.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Project director.

E. PROJECT SUPPORT:
1. Organizational agencies: National Science Teachers Association; National Science Supervisors Association, a section of NSTA.
2. Funding agencies: Internal funding from above organizations.

F. PROJECT HISTORY:
1. Principal originators: National Science Teachers Association and National Science Supervisors Association.
2. Date and place of Initiation: June 1967; NSTA headquarters.
3. Overall project purpose: Identification of behavioral objectives for scientific literacy.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: To examine the statements of goals of science teaching, to select those goals that appear to be most closely related to scientific literacy, and to translate these goal-statements into behavioral objectives that may be used in the development of courses of study that will achieve the desire goals.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Not applicable.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Kindergarten through college.

K. MATERIALS PRODUCED:
1. "Why Behavioral Objectives?" by Albert F. Eiss. Overhead transparency, or slide, tape-sound sequence.
2. "Summary Report of the NSSA-NSTA Workshops on Behavioral Objectives, 1967."
3. "Steps Toward Scientific Literacy"
4. "Behavioral Objectives in the Affective Domain" by Albert F. Eiss and Mary Blatt Harbeck.

L. MATERIALS AVAILABLE FREE: Items 2 and 3 (single copies only, while supply lasts). From: National Science Teachers Association, 1201 Sixteenth Street, N. W., Washington, D. C. 20036.

M. MATERIALS PURCHASABLE:
Item 1: Rental $4 per week; Purchase $25
National Science Teachers Association, 1201 Sixteenth Street, N. W., Washington, D. C. 20036.
Item 4: $2 (Stock No. 471-14582)
Publication Sales Section, National Education Association, 1201 Sixteenth Street, N. W., Washington, D. C. 20036.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None, at present.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None, at present.

Q. PROJECT IMPLEMENTATION: Not applicable.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Write to director.
2. Activities conducted for pre-service and in-service teacher training: Inservice institutes and workshops, financed by registration fees.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Materials being developed, none presently available.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: None.
4. Additional evaluative data available to interested individuals: Address specific inquiries to director.

T. PROJECT PUBLICITY:
1. "NSTA Publications." The Science Teacher, September 1969: 12.
2. "Meetings for College Teachers." The Science Teacher, October 1969: 13.
3. "The NSTA Conferences on Scientific Literacy." The Science Teacher, May 1968: 30.
4. "NSTA Schedules College Conferences." The Science Teacher, September 1968: 92.
5. "Instructional Package Acclaimed." NSTA News-Bulletin, October 1969: 3.

6. "School Organization Discussed at AAAS Meeting." *The Science Teacher*, May 1969: 4.
7. "NSTA Wins Outstanding Communications Award." *Science and Children*, May 1969: 4.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: New publication, *Behavioral Objectives in the Affective Domain*.

V. PLANS FOR THE FUTURE: Further conferences planned for current academic year.

A. PROJECT TITLE: IMPLEMENTING AUTO-TUTORIAL BIOLOGY IN SECONDARY SCHOOLS.

B. PROJECT DIRECTOR: Kenneth H. Bush, Science Coordinator - West Lafayette Schools, Leslie Avenue and Grant Street, West Lafayette, Indiana 47906. (317)743-9502.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Auto-tutorial course instruction in biology.

D. PRINCIPAL PROFESSIONAL STAFF: Curtis Smiley, Biology Teacher; David McGaw, Biology Teacher.

E. PROJECT SUPPORT: None.

F. PROJECT HISTORY:
1. Principal originators: Kenneth H. Bush, Curtis Smiley, David McGaw.
2. Date and place of Initiation: September, 1969; West Lafayette, Indiana.
3. Overall project purpose: Develop and implement auto-tutorial method of instruction in biology.

G. PRESENT COMMERCIAL AFFILIATION: None.

H. PROJECT OBJECTIVES: Self-pacing system; mastery level of accomplishment; student selected sequence and enrichment; based on mini lesson approach with performance objectives.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Biology; principally freshmen in high school; unlimited ability levels.

K. MATERIALS PRODUCED:
1. 40 mini-lessons.
    (a) master tape and script.
    (b) study guide.
    (c) 5 units.
2. Course Outline.
3. Evaluation of attitudes - Jan. 1970.
4. Content Achievement Evaluation - Jan. 1970.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED:
None

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. 40 mini-lessons.
   (a) 7 units.
   (b) enrichment materials.
2. Teacher guide.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 3.
2. Number of students involved: 220.
3. Number of schools involved: 1
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: Pilot program in West Lafayette only.

R. TEACHER PREPARATION: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished research: Test data available from Director.
4. Additional evaluative data available to interested individuals: Yes, upon visitation.

T. PROJECT PUBLICITY: Not answered.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:
First revision due September 1970.

A. PROJECT TITLE: INDIVIDUALIZING INSTRUCTION IN COLLEGE BIOLOGY.

B. PROJECT DIRECTOR: Edwin B. Kurtz, Chairman, Department of Biology, Kansas State Teachers College, Emporia, Kansas 66801. (316)343-1200, Ext. 236.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Courses and instruction in progress during semesters, including summers.

D. PRINCIPAL PROFESSIONAL STAFF: David Bosanko, Instructor; John Ransom, Assistant Professor; Bernadette Menhusen, Michael LeFever, Associate Professors; Carl Prophet, Professor; all of KSTC. Andy Ferko, Instructor, and Robert Hoshaw, Professor, Univ. of Arizona; Donald Edinger, Field Museum of Natural History, Chicago.

E. PROJECT SUPPORT:
1. Organizational agencies: Kansas State Teachers College; University of Arizona.
2. Funding agencies: State of Kansas; State of Arizona.

F. PROJECT HISTORY: Not answered.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:
1. To construct instructional objectives in behavioral terms for undergraduate courses in biology.
2. To construct and evaluate instructional activities and materials designed to help students acquire the specified competencies.
3. To construct an integrated behavioral hierarchy for the college biology courses included in the program.
4. To construct individualized instruction and sequences in which 90 percent of all students acquire 90 percent of the competencies while working at their own rate.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: General biology (freshman); biology of populations (sophomore); field and lab biology (sophomore, elementary education majors); general genetics (junior); plant morphology (graduate).

K. MATERIALS PRODUCED:
1. Field and Lab Biology - A Process Approach - for Elementary Teaching Majors, 1969.

2. Biology of Populations, 1969.
3. Biology - An Individualized Approach, 1970.
4. Plant Morphology - A Process Approach, 1969.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: No. 1 - $2.70; No. 2 - $1.55; No. 3 - $8.98. From KSTC Memorial Union Bookstore, Emporia, Kansas 66801.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
General Genetics - An Individualized Approach.
Instructor's Guide for Individualizing Instruction.

Q. PROJECT IMPLEMENTATION: A total of 3000 students are enrolled at KSTC in the courses described.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: None.
2. Activities conducted for pre-service and in-service teacher training: Not answered.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: In preparation.

T. PROJECT PUBLICITY:
R. W. Hoshaw, E. B. Kurtz, and F. A. Ferko, "Plant Morphology - A Process Approach", CUEBS News, 5, (4): 1-3, April 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Not answered.

A. PROJECT TITLE: INDIVIDUALLY PRESCRIBED INSTRUCTION IN SCIENCE (IPI SCIENCE).

B. PROJECT DIRECTOR: Dr. Leopold E. Klopfer, Director, IPI Science, Learning Research and Development Center of the University of Pittsburgh, 160 North Craig Street, Pittsburgh, Penna. 15213. (412) 683-8640.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Oakleaf Elementary School implementation of A, B, and C Science levels.

D. PRINCIPAL PROFESSIONAL STAFF: Mrs. Audrey Champagne, Consultant; Maria Clark, Res. Assoc.; Robert Costa, Res. Asst.; Dr. Leopold Klopfer, Director; Dr. Albert P. Nous, Res. Assoc.; Mrs. June Pittman, Res. Asst.; Victor L. Weber, Res. Asst.

E. PROJECT SUPPORT:
1. Organizational agency: Learning Research and Development Center of the University of Pittsburgh.
2. Funding agency: U.S. Office of Education.

F. PROJECT HISTORY:
1. Principal originators: Robert Glaser, John O. Bolvin, Joseph Lipson.
2. Date and place of Initiation: 1964; University of Pittsburgh.
3. Overall project purpose: The development of a complete individualized science program which will serve every student from his entry into the elementary school to the beginning of high school.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: The long-term plans of this project are determined by its over-all aim -- the development of a complete individualized science program. Complete is emphasized because a partial solution to the problem of individualized learning in science is no solution at all as far as its operability and acceptance in schools is concerned. A complete program includes not only a well-developed curricular structure, rich resources of learning materials, and a carefully worked-out array of testing materials, but also management procedures for individualization, procedures for continual evaluation and improvement of the program, and provisions for teacher orientation. The development of these facets of the complete IPI Science Program is already under way. Over the next five years, the development of learning materials will continue and expand, trials of the materials and program components will be conducted at the Oakleaf School and elsewhere, and modifications

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IPI SICENCE - PRINCIPAL PHASES

IPI SCIENCE LEVEL	A B C D	E F G	H I J
APPROX LEVEL	K - 3	4 - 6	7 - 9
CURRIC. DESIGN.	EXPLORATORY PHASE	INQUIRING PHASE	INVESTIGATIVE PHASE
DESCRIPTION	(1) introduction to process skills	(1) applications of process skills in problem solving	(1) utilizing process skills and knowledge in conducting inquiries: genuine investigations
	(2) explorations of knowledge	(2) accumulation of knowledge	(2) concrete to abstract subject-matter: formulation of laws and principles; formulation and testing of theoretical models
	(3) concrete-empirical experiences and subject-matter	(3) concrete to abstract subject-matter: formulation of empirical laws and principles	(3) alternative pathways may be followed for an extended period, up to several months
	(4) alternative pathways generally of short duration, one or a few days	(4) alternative pathways of short to moderate duration, from one day to a few weeks	(4) principal instructional modes: reading selections; guided inquiry, with gradual transition to free inquiry
	(5) principal instructional mode: initially aural, with gradual transition to written directions	(5) principal instructional modes: written directions; reading selections; guided inquiry experiences	
SCIENCE CONCEPTS ORG. THEME	MAN AND HIS SYSTEMS: Natural Living Systems, Natural Non-Living Systems, and Man-Made Systems		THE BIOSPHERE: ECOSYSTEM OF THE EARTH

based on trial experiences will be made to produce the finished program. The IPI Science development process will be accompanied and complemented by a research program in several areas of interest. These areas include research on student behavior in learning science in an individualized setting, manipulation and evaluation of variables in the affective domain, and application of computer technology to management and instructional aspects of an individualized science program. To provide a context for the ensuing discussion, a chart of the principal phases of the IPI Science Program is presented on the next page. As the chart shows, the finished program will have ten levels, viz. the Exploratory Phase (Levels A to D), the Inquiring Phase (Levels E to G), and the Investigative Phase (Levels H to J). In each level, there is a common core of basic science learning for all students. This is called the "Mainstream," and every student is expected to achieve mastery of the skills and content presented here. In addition, at each level there are numerous "Alternative Pathways," through which individual students can pursue their learning in science. These Alternative Pathways increase in variety and duration through the three phases of the program.

Goals: In view of the societal setting and the character of science in the 1970's, it seems reasonable and appropriate to assert five goals for the IPI science program. The first two goals are derived from the need to develop effective independent learners. The other three goals concern the attitudes, inquiry skills, and understandings that the student should attain through his experiences in the science program.

I. The student views the learning process as primarily self-directed and self-initiated. (STUDENT SELF-DIRECTION GOAL)

II. The student plays a major role in evaluating the quality, extent, and rapidity of his learning. (STUDENT CO-EVALUATION GOAL)

III. The student displays positive attitudes toward his study of science, scientific inquiry, and the scientific enterprise. (AFFECTIVE GOAL)

IV. The student is skillful in using the processes of scientific inquiry and he is able to carry out inquiries. (INQUIRY GOAL)

V. The student acquires a foundation of scientific literacy. (SCIENTIFIC LITERACY GOAL)

The project uses a variety of learning resources to implement its goals. Among them are: taped lessons, directed group activities, self-initiated independent activities, learning games, mini-explorations, programmed materials, etc. Contact the director for a detailed chart of which activities are used in each of the goals.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Individual taped lessons, Directed group activity, Student activity, Self-initiated activity, Science learning games, Individual reading lessons, Mini-explorations, Programmed learning materials, Student seminars, Mini-investigations, Student publications.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Grade Levels: K-9; all ages and abilities within the respective groups.

K. MATERIALS PRODUCED: These experimental versions have previously been tested at the Oakleaf School and are now ready for field trial and large scale testing at the schools listed in Q7.

Level - A (roughly first grade)

1. Color.
2. Size.
3. Sound.
4. Smells.
5. Iron Pullers.
6. Sorting Things.
7. Inching Along.
8. Shapes.
9. Volume.
10. New Sorts.
11. Sink or Swim (Exploring) Pivot Lesson
12. Time.
13. Time and Temperature.

Level - B

14. Natural Environment.
15. Symmetry.
16. Forces.
17. Physical States.

L. MATERIALS AVAILABLE FREE:
The IPI Science Sampler Brochure from: project headquarters.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None (as of yet).

P. ADDITIONAL MATERIALS BEING DEVELOPED:
For Levels C to J.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 15.
2. Number of students involved: 400.
3. Number of schools involved: 7.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated in 1 and 2. Definitive in 3.

5. Name and location of selected schools where the course is being taught: McAnnulty School, Pittsburgh, Pa.; Flood School, Wilkes-Barre, Pa.; West Dover School, Dover, Del.; Washington School, Trenton, N.J.; Richland School, Quakertown, Pa.; Oakleaf School, Pittsburgh, Pa.; Downey School, Harrisburg, Pa.

R. TEACHER PREPARATION:

1. Consultant services available to teachers using the materials: Developed through Research for Better Schools, Philadelphia, Pa.
2. Activities conducted for pre-service and in-service teacher training: None as yet.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None as yet.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff and Research for Better Schools, Inc.
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished research: The existing research conducted to this point has been conducted with materials out at Oakleaf School and the feedback obtained from their implementation.
4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY:

1. Leopold E. Klopfer, "IPI Science: A Teaching Revolution in the Making", Science Activities, Vol. I, 1969.
2. Joseph I. Lipson, "An Individualized Science Laboratory", Science and Children, Vol. IV, No. 4, December 1966. (ED-013-664)

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE: Not answered.

A. PROJECT TITLE: INTERMEDIATE SCIENCE CURRICULUM PROJECT (ISCS).

B. PROJECT DIRECTOR: Professor Ernest Burkman, Director of ISCS, 507 South Woodward Avenue, Tallahassee, Florida 32304. (904)224-6212.

C. PROJECT HEADQUARTERS:
1. Contact: Adrian D. Lovell at project headquarters.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. Robert Cocanougher, Miss Betsy Conlon, Mr. Stewart Darrow, Mr. James A. Hathway, Dr. John S. Hutchinson, Mr. Adrian D. Lovell, Dr. David D. Redfield, Dr. William R. Snyder.

E. PROJECT SUPPORT:
1. Organizational agencies: None.
2. Funding agencies: United States Office of Education, National Science Foundation.

F. PROJECT HISTORY:
1. Principal originator: Dr. Ernest Burkman.
2. Date and place of Initiation: June, 1966 (Pilot study began June, 1964); Florida State University.
3. Overall project purpose: To develop a comprehensive science program for grades 7 - 9.

G. PRESENT COMMERCIAL AFFILIATIONS: Silver Burdett Company (written materials); Damon Engineering (equipment).

H. PROJECT OBJECTIVES:
1. To develop a comprehensive science program for grades 7-9.
2. Student materials are being written in "self pacing" style. The students work through them at their own rate.
3. "Package" will contain materials designed for all student levels. "Excursions" (supplemental materials) are vehicle for accomodating both better than average and below average students.
4. The project is using computer assisted instruction as a vehicle for evaluation.
5. Sequence features gradual building of process skills and sequential development of basic notions. Transition is from tight structure in grade 7 to open ended activities in grade 9.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups, Computer assisted instruction.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science for grades seven, eight, and nine. All ability levels.

K. MATERIALS PRODUCED:

1. Seventh grade materials - Vol. I, Vol. II, Teachers Guides, Tests, Additional Problems and Excursions. Response Book, Answer Keys, Behavioral Objectives.
2. Eighth grade materials - Vol. III, Vol. IV, Vol. V, Teachers Guides, Tests, Additional Problems and Excursions. Answer Keys and Response book.
3. Ninth grade materials - Vol. IV, Vol, V, Vol. VI, Vol. VII, Vol. VIII, Vol. 3A, Vol. 3B, Vol. 3C, Vol. 3D, Teachers Guides, Tests.
4. Newsletters 1 - 5.
5. Brochures (four).

L. MATERIALS AVAILABLE FREE: Newsletter and Brochure from project headquarters.

M. MATERIALS PURCHASABLE: Contact: Product Manager, Intermediate Science Curriculum Study, Silver Burdett Company, Morristown, New Jersey 07960.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None as yet.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 662.
2. Number of students involved: 69,046.
3. Number of schools involved: 450 (est'd)
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: 22 states and Philippines.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: The project has set up, in addition to center leaders and teachers using the program, regional consultants in areas around the United States, whose names were published in Newsletter No. 5.
2. Activities conducted for pre-service and in-service teacher training: Drive-in conferences; orientation sessions; CCSS program; 2 week intensive conferences; summer institutes; regional conferences.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers:

Teacher education materials are under development at this time.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated: Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: In-house research to date has been primarily formative. Summative studies are being prepared for reporting as is suggested in 4 below.
4. Additional evaluative data available to interested individuals: A newsletter should be published by May 1970 giving preliminary results on trial editions in ISCS testing centers. More detailed technical reports on specific subjects should be available by September, 1970. ISCS Newsletter No. 5 identifies field test centers and center leaders as well as ISCS demonstration centers.

T. PROJECT PUBLICITY: Not answered.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Course expanded to include 7th, 8th, and 9th grades, with two revisions of 7th in preparation for the commercial edition and two revisions of 8th for the final experimental edition. Additional blocks added to the 9th grade, and existing blocks revised. Fifty drive-in conferences held, five teacher education sessions conducted, and a teacher education manual written. Project presentations in 17 summer institutes in 1969.

V. PLANS FOR THE FUTURE: Revision of 9th grade experimental units-summer 1970; commercial version of 8th grade - available in Fall, 1971; commercial version of 7th grade - available in Fall, 1970; total 9th grade package to consist of 8 units with content including: meterology, genetics, measuring variations, astronomy, geology, environmental biology, space science, and a unit on drugs, smoking, and health.

A. PROJECT TITLE: INTERRELATED MATHEMATICS SCIENCE PROJECT - I.M.S.

B. PROJECT DIRECTOR: Mr. John E. Arena, Director, Nova Schools - Secondary Division, 3600 S. W. College Avenue, Fort Lauderdale, Florida 33314. (305)587-0600, Extension 65.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director.
2. Special facilities or activities available for visitor viewing: Learning activity packages in science and mathematics; scope and sequences; individualized instruction at Nova schools; use of multi media.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. William Thrasher - Teacher Writer - Science; Mrs. Ellen Hannan - Teacher Writer - Science; Dr. David Rubin - Teacher Writer - Science; Dr. Edgar C. Perry - Editor; Pearl Schriber - Math; James Shannon - Math; Patrick Bacon - Math; Dr. T. Banks - Research.

E. PROJECT SUPPORT:
1. Organizational agencies: Not answered.
2. Funding agencies: U. S. Office of Education, Title III.

F. PROJECT HISTORY:
1. Principal originators: Paul Bethune, Warren Smith, Laurence Wantuck - Nova Schools.
2. Date and place of Initiation: 7/1/68; Nova High School.
3. Overall project purpose: To develop an individualized program of instruction in science and mathematics grades 9-12 interrelating the two subject areas using learning activity packages as the instrument for instruction.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: To develop learning activity packages that may be used in any school and requiring no special materials or facilities. To use a multi-media approach in the learning of mathematics and science. To interrelate mathematics and science wherever applicable.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, multi-media.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science and mathematics grades 9-12; all ability levels.

K. MATERIALS PRODUCED:
1. Learning Activity Packages:
(a) Genetics.
(b) Simple Plants.

(c) Higher Plants.
(d) Evolution and Environment.
(e) Introduction to Atomic Theory.
(f) How Atoms Combine.
(g) Animal Anatomy and Physiology.
(h) Continuity of Life and Material.
(i) Classification of Atoms.
(j) Properties of Mathematical Operations.
(k) Rational and Irrational Numbers.
(l) Solution Sets to Systems.
(m) Orientation Package for Students.

L. MATERIALS AVAILABLE FREE: Brochure describing project.

M. MATERIALS PURCHASABLE: All items in Question K. $1.00 each. Order from: Department of Dissemination, Nova High School, 3600 S.W. College Avenue, Fort Lauderdale, Florida 33314.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Learning Activity Packages for entire sequence grades 9-12 in science and mathematics; teachers and administrators handbook for implementing individualized instruction; student orientation Learning Activity Packages.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: Not answered.
2. Number of students involved: 6500.
3. Number of schools involved: 5 at present.
4. Total number of teachers using any of the materials: About 50.
5. Total number of students using any of the materials: About 6500.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimates.
7. Name and location of selected schools where course is being taught: Northeast High School, Hollywood Hills High School, Dillard High School, Nova High School, all located in Broward County, Florida; Valhalla High School, Valhalla, New York.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Staff members are available to assist teachers.
2. Activities conducted for pre-service and in-service teacher training: Two workshops per year, one in October - one in April. USOE Financed. Project is explained, materials

reviewed, problems discussed. Suggestions for implementation presented by staff.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Teachers handbook will be available after November 1, 1970.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None yet.
3. Brief abstract of in-house or unpublished research: Model learning activity packages were used in four schools during the spring of 1969. Results indicate children at grade levels 8-9 did as well learning through packages as did others following conventional method. Motivation factor was higher with packages and children received more help with reading and other problems.
4. Additional evaluative data available to interested individuals: Not at present but expected by March 15, 1970.

T. PROJECT PUBLICITY: None yet.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Workshop planned for last week in April, first week in October.

A. PROJECT TITLE: INTRODUCTORY PHYSICAL SCIENCE (IPS).

B. PROJECT DIRECTOR: Dr. Uri Haber-Schaim, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160. (617)969-7100.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: A number of people have worked on the project at various times. The preface to the textbook includes acknowledgments.

E. PROJECT SUPPORT:
1. Organizational agency: Education Development Center.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originator: The preface to the textbook gives acknowledgments.
2. Date and place of Initiation: 1963; Educational Services Incorporated, Watertown, Mass.
3. Overall project purpose: To develop basic attitudes and skills with regard to science and to offer students insight into the means by which scientific knowledge is acquired, as well as offering students a beginning knowledge of physical science.

G. PRESENT COMMERCIAL AFFILIATIONS: Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632; Macalaster Scientific Company, Rte. 111 & Everett Turnpike, Nashua, N.H.; Modern Learning Aids, 1212 Ave. of the Americas, New York, N.Y. 10036.

H. PROJECT OBJECTIVES: To develop a one-year course in physical science for use in junior high schools. Student laboratory work is of primary importance. To emphasize this, the laboratory instructions are incorporated in the body of the text; the results are not described. The equipment has been designed in such a way that students can perform experiments in ordinary classrooms. These objectives are stated in the preface to the textbook.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, Laboratory investigations, Lectures, Pre- and post-lab discussions, Home-work assignments.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: The major emphasis in the course is the study of matter. The course has been extensively used in grades 8 and 9 with students who have a wide range of abilities. In addition, many schools have used the course in grades 11 and 12 for students who do not plan to take further physics or chemistry.

K. MATERIALS PRODUCED:

1. Textbook.
2. Teacher's Guide.
3. Laboratory Equipment and Apparatus.
4. Achievement Tests.
5. Laboratory Tests.
6. Films.
7. Descriptive brochure.

L. MATERIALS AVAILABLE FREE:
Item 7, from Physical Science Group, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160.

M. MATERIALS PURCHASABLE:
Item 1, $3.66 (cloth) or $2.25 (paper) from Educational Book Division, Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.
Item 2, $5.58 from Educational Book Division, Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.
Item 3, prices vary; catalog can be obtained from Educational Book Division, Prentice-Hall, Inc., Englewood Cliffs, N.J. or Macalaster Scientific Company, Route 111 and Everett Turnpike, Nashua, New Hampshire 03060.
Item 4, $11.58/package from Educational Book Division, Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.
Item 5, $1.02, from Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.
Item 6, prices vary, from Modern Learning Aids, 1212 Avenue of the Americas, New York, N.Y. 10036.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED:
French, Japanese, Korean, Portuguese, Spanish.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Approximately 7,000.
2. Number of students involved: Approximately 700,000.
3. Number of schools involved: Uncertain.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: Not answered.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: None, however the Physical Science Group is

instrumental in setting up workshops and recommending workshop instructors.
2. Activities conducted for pre-service and in-service teacher training: See answer to R1.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: See answer to M.

S. PROJECT EVALUATION: Not answered.

T. PROJECT PUBLICITY: Not answered.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Series C Achievement Tests are now commercially available. Laboratory tests are now commercially available.

V. PLANS FOR THE FUTURE: The project has been completed.

A. PROJECT TITLE: K-12 SCIENCE DESIGN (LAS CRUCES).

B. PROJECT DIRECTOR: Mr. J. Paul Taylor, Director, Program Development, Las Cruces School District No. 2, 301 West Amador Avenue, Las Cruces, New Mexico 88001. (505)524-2894.

C. PROJECT HEADQUARTERS:
1. Contact: Mrs. Mary Jane Wood, Elementary Curriculum Coordinator, Las Cruces School District No. 2, 301 West Amador Avenue, Las Cruces, New Mexico 88001. (505)524-2894.
2. Special facilities or activities available for visitor viewing: Teacher utilization of guide in regular class activity.

D. PRINCIPAL PROFESSIONAL STAFF: Not answered.

E. PROJECT SUPPORT:
1. Organizational agencies: Las Cruces School District No. 2.
2. Funding agencies: Las Cruces School District No. 2.

F. PROJECT HISTORY:
1. Principal originator: Las Cruces School District No. 2.
2. Date and place of Initiation: September 1961; Las Cruces School.
3. Overall project purpose: To establish an articulated program in science, grades 1-12.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Objectives are stated in the introductory section of each guide. Purpose is to study curricula in science and develop a design which would meet our school district's needs.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Not answered.

K. MATERIALS PRODUCED:
1. Resource Units for First Grade Science.
    a. What Can You Do For Good Health?
    b. The Earth On Which We Live.
    c. What Is Our Earth Like?
    d. What Makes Toys Work?
    e. Why Are Plants Important To Us?
    f. What Is A Farm?
    g. The Zoo.

2. Resource Units for Second Grade Science.
    a. Animal Unit.

   - b. Our Five Major Senses.
   - c. Materials and Energies of the Earth.
   - d. The Universe.

3. Rsource Units for Third Grade Science.
   - a. The Earth in the Solar System.
   - b. Weather.
   - c. Sound.
   - d. Light.

4. Resource Units for Fourth Grade Science.
   - a. Mother Earth's Diary, Let's Find Her Secrets.
   - b. Plants.
   - c. Animals.
   - d. Desert Plants and Animals.
   - e. The Human Machine.

5. Resource Units for Fifth Grade Science.
   - a. Matter From State to State.
   - b. Conservation of Soil, Water, and Air.
   - c. Our Bodies--Chemical Factories; or the Chemistry of Nutrition.

6. Resource Units for Sixth Grade Science.
   - a. Magnetism and Electricity.
   - b. How Does Man Use Light and Sound in the World of Communication?
   - c. The Everyday Atom.
   - d. Stairway to the Stars.
   - e. Air Physics.

7. Resource Units for Seventh Grade Biology.
   - a. All Matter is Made of Elements.
   - b. Living Things are Dependent Upon Their Environment.
   - c. There are Many Kinds of Living Things.
   - d. Living Things Peform Certain Functions in Order to Live.

8. Resource Units for Eighth Grade Chemistry and Earth Science.
   - a. Matter Matters.
   - b. The Earth in the Universe.

9. Resource Units for Ninth Grade Physics.
   - a. Matter, Motion and Force.
   - b. Waves and Electrons.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: Science Guides, Grades 1-9, single copies $1.50 per grade level. Address correspondence to: Mrs. Mary Jane Wood, Elementary Curriculum Coordinator, Las Cruces School District No. 2, 301 West Amador Avenue, Las Cruces, New Mexico 88001.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 330.
2. Number of students involved: 11,000.
3. Number of schools involved: 24.
4. Total number of teachers using any of the materials: 330 are utilizing Science Guides for their specific grade level.
5. Total number of students using any of the materials: Approximately 11,000 within our school district. Total involvement, Grades 1-8; so total number of students were used; 1/3 of the total 9th grade students were estimated to be in science classes since 9th grade science is an elective.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Grades 1-8 definitive; 9th grade - estimated.
7. Name and location of selected schools where the course is being taught: All Elementary and Junior High Schools in Las Cruces School District No. 2.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Consultant service provided by Elementary Coordinator.
2. Activities conducted for pre-service and in-service teacher training: Principal's inservice in problem approach in science.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION: Not answered.

T. PROJECT PUBLICITY: Not answered.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE: Not answered.

A. PROJECT TITLE: LANGUAGE DEVELOPMENT/BILINGUAL EDUCATION LEARNING SYSTEM - ORAL LANGUAGE DEVELOPMENT, SCIENCE CONTENT.

B. PROJECT DIRECTOR: Dr. Theodore Anderson, Director, Language Development/Biological Education Program, Southwest Educational Development Laboratory, 800 Brazos Street, Austin, Texas 78701. (512)476-7761.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: We gladly arrange with schools for authorized visits to be organized in advance.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. Elizabeth Ott, Coordinator, Language Development Branch; Mr. Earl Martin, Assistant Coordinator, Language Development Branch.

E. PROJECT SUPPORT:
1. Organizational agencies: Title IV, ESEA; Follow Through Program; OEO; Texas Education Agency, Migrant Education.
2. Funding agencies: Title IV, ESEA; Follow Through Program; OEO; Texas Education Agency, Migrant Education.

F. PROJECT HISTORY:
1. Principal originator: Dr. Thomas D. Horn, Chairman, Department of Curriculum and Instruction, University of Texas, Austin, Texas 78712.
2. Date and place of Initiation: September 1964; San Antonio Independent School District.
3. Overall project purpose: To improve the education of Spanish-speaking Mexican-American children.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: In particular the project is intended to promote the oral language development (English & Spanish) and the concept formation of the target population mentioned above. These goals are stated in prefaces by Dr. Edwin Hindsman, Executive Director, Southwest Educational Development Laboratory, in each of the teacher's manuals.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science, K-6.

K. MATERIALS PRODUCED:
1. Oral Language Development, Science, K.
2. Oral Language Development, Science, K-1.
3. Oral Language Development, Science, 1.

4. Oral Language Development, Science, 2.
5. Oral Language Development, Science, 3.
6. Oral Language Development, Science, 4.
7. Oral Language Development, Science, 5.
8. Oral Language Development, Science, 6.

L. MATERIALS AVAILABLE FREE: Cost covered by contract with cooperating school districts.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Spanish.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 500.
2. Number of students involved: 15,000.
3. Number of schools involved: 100.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: San Antonio, Texas; New York City; Philadelphia; Breaux Bridge and Lafayette, La.: Los Angeles; Tulane and Cutler-Orosi, Calif.; M.C. Allen, San Diego; Rio Hondo, Edconch-Elsa, Texas.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Leadership Training Conferences in the summer preceding the introduction of the materials and in the middle of the year.
2. Activities conducted for pre-service and in-service teacher training: Mentioned above. Cost covered by funding source or on contract with school systems.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None specifically for science teachers.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: Conspicuously significant results have not yet been obtained.

4. Additional evaluative data available to interested individuals: Authorized persons may write to: Dr. Robert Randall, Director, Research and Evaluation Division, Southwest Educational Development Lab., 800 Brazos, Austin, Texas 78701.

T. PROJECT PUBLICITY: None.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Expanding gradually. Materials, especially in Spanish, being revised.

V. PLANS FOR THE FUTURE:
Same as above.

A. PROJECT TITLE: LOW ACHIEVERS MATERIALS PROJECT (LAMP). INVESTIGATIONS IN SCIENCE.

B. PROJECT DIRECTOR: David P. McLaren, Secondary Science Supervisor, Los Angeles City Unified School District, P.O. Box 3307, Terminal Annex, Los Angeles, California 90054. (213) 625-8911, Ext. 2053.

C. PROJECT HEADQUARTERS:

1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Printed material at project director's office. Kits for selected investigations at Secondary Science Center. Use of materials in junior high schools.

D. PRINCIPAL PROFESSIONAL STAFF: David P. McLaren, Science Supervisor; Barbara Lindquist and Francis Curry, Temporary Consultants; Gerald J. Garner, Secondary Science Center Specialist.

E. PROJECT SUPPORT:

1. Organizational agency: Los Angeles City Unified School District.
2. Funding agency: Los Angeles City Unified School District.

F. PROJECT HISTORY:

1. Principal originators: Junior High School Science Advisory Committee (composed of junior high school science teachers, administrator, science specialist, and science supervisor).
2. Date and place of Initiation: February, 1968; Los Angeles.
3. Overall project purpose: To provide science material for a wide variety of 8th grade low achievers with reading problems.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:

1. To help students develop science concepts expected in the junior high school by providing reading material at the level of these students.
2. To overcome student frustration in reading.
3. To create interest in science concepts.
4. To provide developmental reading activities based on word attack, context cues, and vocabulary building activities, such as word recognition and vocabulary games.
5. To develop science concepts through student participation in investigative laboratory activities.

Objectives are stated in the teacher's handbook.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Junior high school science; grade 8; age 12-14; low achievers at any ability level.

K. MATERIALS PRODUCED:
1. Teacher's handbook.
2. Printed consumable pupil material for each investigation consisting of six units:
    Unit 1: Building Blocks of Science. (12 investigations).
    Unit 2: Building Blocks of the Universe. (22 investigations)
    Unit 3: Building Blocks of Life. (22 investigations)
    Unit 4: Explorations: Earth. (17 investigations)
    Unit 5: Explorations: Space. (7 investigations)
    Unit 6: Explorations: The Sea, a Science Frontier. (4 investigations)
3. Kits of consumable laboratory supplies for specific investigations requiring materials unique to LAMP.

L. MATERIALS AVAILABLE FREE: Outline of the LAMP program. Sample investigations.

M. MATERIALS PURCHASABLE: Units 1, 2 and 3 available from: Dr. Johns Harrington, Editor of School Publications, Los Angeles City Unified School District, P.O. Box 3307, Terminal Annex, Los Angeles, California 90054. Cost not established.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: Approximately 150.
2. Number of students involved: Approximately 6,800.
3. Number of schools involved: 85.
4. Total number of teachers using any of the materials: Approximately 200.
5. Total number of students using any of the materials: Approximately 7,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Close estimate, except for No. 3, which is actual count.
7. Name and location of selected schools where the course is being taught: All junior high schools, one six-year school, and eight special education schools, in Los Angeles.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Project Director and Science Center Specialist.
2. Activities conducted for pre-service and in-service teacher training: New teacher orientation. Ten simultaneous orientation meetings in convenient locations throughout the district. Financed by local district.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: See item "L".

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: Teachers indicate success with students for whom LAMP is intended.
4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: None.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Teacher's handbook scheduled for revision Summer, 1970.

A. PROJECT TITLE: THE MADISON PROJECT OF SYRACUSE UNIVERSITY AND WEBSTER COLLEGE.

B. PROJECT DIRECTOR: Professor Robert B. Davis, Mathematics Department, Smith Hall, Syracuse University, Syracuse, New York 13210. (315)476-3768 or (315)GR6-5541, ext. 2336.

C. PROJECT HEADQUARTERS:

1. Contact: The Madison Project, 918 Irving Avenue, Syracuse, New York 13210.

2. Special facilities or activities available for visitor viewing: By special arrangement it is possible to visit classrooms in various schools, including culturally deprived situations, non-graded schools using various forms of flexible programming and team teaching, etc. In addition, it is possible to view project films (which also show actual classroom lessons), and to talk with project personnel about specific problems of various sorts. Some project classrooms center around "mathematics laboratories."

D. PRINCIPAL PROFESSIONAL STAFF: David M. Clarkson, Associate Director; Donald Cohen, Coordinator for New York City; Alan Barson, Coordinator for Philadelphia; Mildred Williams, Coordinator for Chicago; Bill McConnell, Coordinator for St. Louis; George Arbogast, Coordinator for Los Angeles.

E. PROJECT SUPPORT:

1. Organizational agencies: Syracuse University, Webster College and a group of participating school systems.

2. Funding agencies: National Science Foundation; Marcel Holzer Foundation; The Alfred P. Sloan Foundation; and a group of industries and trade unions in the St. Louis area, as well as by contributions from participating schools and colleges.

F. PROJECT HISTORY:

1. Principal originators: Robert B. Davis, Donald E. Kibbey, Beryl S. Cochran and the faculties of Syracuse University and Webster College.

2. Date and place of Initiation: 1957; Syracuse, New York and Weston, Connecticut.

3. Overall project purpose: Not answered.

G. PRESENT COMMERCIAL AFFILIATIONS: Four volumes of materials are available from Addison-Wesley Publisher, namely: Discovery in Mathematics, Student Discussion Guide and Text for Teachers; and Explorations in Mathematics, Student Discussion Guide and A Text for Teachers.

H. PROJECT OBJECTIVE: To develop, disseminate and implement a supplementary program in mathematics for nursery school through grade 12. Special attention is given to the kind of creative learning experience which children can have in school and outside of school. This involves extensive consideration of the social organization of the classroom and of similar matters. In general, the "point of intervention" for the Madison Project is either at the point of actual classroom experience of the child, or else at the point of instructional planning on the part of the teachers. It is not at the point of designing textbooks or producing textbooks. Because of the emphasis on actual classroom experiences, the project makes a very large number of video-tapes and films that show actual classroom lessons. At the present time, these films, or excerpts from them, are avilable in many different forms for study by teachers or by prospective teachers. In addition, the project for the last three years has put special emphasis upon "mathematical laboratories" and the use of physical materials; in doing this, it has often joined forces with the Elementary School Science (ESS) Project of ESI, and with the Nuffield Mathematics Project in England. The project has put particular emphasis upon operating workshops for teacher education, particularly in the cities of San Diego, Los Angeles, Chicago, New York, Philadelphia, St. Louis, and Washington, D. C.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Lectures, Seminars, and Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: The Madison Project is, of course, concerned with both materials and with methods; its work might, consequently, be described as dealing both with curriculum and with instruction. The present summary of mathematical content should not, therefore, obscure the fact that the project's activities have dealt with equal emphasis in both the curriculum area and the instruction area. The project's mathematical content divides into two portions: the first part deals with mathematical content which is relatively novel at the grade levels in question. This includes mainly coordinate geometry, an axiomatic approach to algebra, some mathematical logic, the theory of limits, and application to physical science. A second (and more recent) part of the project materials deals with topics which are relatively familiar at the grade levels in question, which the project is concerned mainly with improving the child's opportunities to learn the basic ideas. This latter portion deals, necessarily, mainly with fundamental ideas of arithmetic (such as: place value numerals, the concept of division, etc.) Grade levels range from nursery school through college.

K. MATERIALS PRODUCED:

1. Discovery in Mathematics. (Publishers, Addison-Wesley Publishing Co., Inc.) Student discussion guide, plus text for teachers. This book provides a supplementary program in

coordinate geometry, axiomatic algebra, and applications to science, suitable especially for grades 4-8. It is concerned particularly with creative learning experiences of a non-routine nature.

2. Explorations in Mathematics. Student discussion guide, plus text for teachers. This book is concerned with introductory ideas in algebra, statistics, mathematical logic, matrix algebra, and some applications to physics. Special emphasis is placed upon historical background, and the study of this book can be closely related to various units in social studies (such as the life and times of Rene Descartes). It is suitable for grades 6 through 9, inclusive.

3. A Modern Mathematics Program as it Pertains to the Interrelationship of Mathematical Content, Teaching Methods, and Classroom Atmosphere. (The Madison Project). 1963. Report submitted to the Commissioner of Education, U. S. Office of Education, fall, 1963. This provides a general view of Madison Project activities.

4. A Modern Mathematics Program as it Pertains to the Interrelationship of Mathematical Content, Teaching Methods, and Classroom Atmosphere. (The Madison Project). 1965. Report submitted to the Commissioner of Education, U. S. Office of Education, fall, 1965. Note that this is distinguishable from item 3 above only by the date. The 1965 report is the most comprehensive description presently available of Madison Project materials and activities.

5. The Madison Project - A Brief Introduction to Materials and Activities (1965).

6. Notes on the Film: First Lesson. (This pamphlet accompanies the film of the same name.)

7. Robert B. Davis, Some Remarks on "Learning By Discovery".

8. Robert B. Davis, The Next Few Years.

9. Robert B. Davis, Experimental Course Report/Grade Nine.

10. Doris Machtinger, Experimental Course Report/Kindergarten.

11. Supplementary Modern Mathematics for Grades 1 through 9. In-Service Course #1 for Teachers. This is a complete "packaged" in-service course, including films, written materials, and laboratory equipment.

12. Supplementary Modern Mathematics for Grades 2 through 9. In-Service #2 for Teachers. This is a sequel to item 11 above.

13. Audio tape recording #D-1: $\square + \square = 2 \times \square$. This is a recording of an actual classroom lesson with fifth grade children, proving algebraic theorems from a set of axioms selected by themselves.

14. Film (16 mm., sound, black and white) A Lesson with Second Graders. This film shows an actual classroom lesson involving signed numbers, the number line, and Cartesian co-ordinates. Viewing this film is one of the best introductions to project activities.

15. Film (16 mm., sound, black and white) Complex Numbers via Matrices. This film shows an actual classroom lesson. Seventh grade students use the isomorphism between rational numbers and

a sub-set of the set 2-by-2 matrices to facilitate an extension into complex numbers.
16. Film (16 mm., sound, black and white) Matrices. An actual classroom lesson. Fifth and sixth graders explore the algebra of 2-by-2 matrices.
17. Film (16 mm., sound, black and white) Solving Equations With Matrices. An actual classroom lesson, similar to item 15 above, but less sophisticated. Sixth grade students.
18. Film (16 mm., sound, black and white) Average and Variance. An actual classroom lesson, with 6th grade children.
19. Film (16 mm., sound, black and white) Graphing an Ellipse. An actual classroom lesson, with 7th grade students.
20. Film (16 mm., sound, black and white) Circles and Parabolas . An actual classroom lesson, with 6th grade children.
21. Film (16 mm., sound, black and white) First Lesson. An actual classroom lesson, with a mixed class of children from grades 3 to 7.
22. Film (16 mm., sound, black and white) Second Lesson. This lesson occurred on the day following that shown in item 21 above, with the same students.
23. Film (16 mm., sound, black and white) Weights and Springs. A "laboratory" lesson, with 6th grade children.
24. Film (16 mm., sound, black and white) Graphing a Parabola. This is a portion of the film listed in item 20.
25. Film (16 mm., sound, black and white) Guessing Functions. A seventh grade class of culturally deprived urban children.
26. "Shoebox" packages for physical experiments related to the mathematics program, or for physical and tactile experiences related to the learning of mathematics. (The project also makes use of physical materials prepared by Z. P. Dienes, by ESS, by Nuffield Project, and by others, as well as desk calculators of various sorts.)

L. MATERIALS AVAILABLE FREE: This varies according to the availability of reprints of various articles. The Madison Project, 918 Irving Avenue, Syracuse, New York 13210.

M. MATERIALS PURCHASABLE: Items 1 and 2 from Section K.
1. Student Text, $2.48; Teacher Text $8.00.
2. Student Text, $2.68; Teacher Text $8.00.
(Order from: Addison-Wesley Publishing Co., Inc., Reading, Mass.)

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None planned at present.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Very large, but unknown.

2. Name and location of selected schools where your course is being taught: Exemplary classrooms may be located by contacting the Madison Project big city coordinators listed in D.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Although the Project has limited staff to respond to inquiries in Syracuse, consultant services are available from Madison Project personnel throughout the country. These people may be reached through the Syracuse office or through to big city coordinators. See the listing under Section D.

2. Activities conducted for pre-service and in-service teacher training: The Project personnel have offered courses for pre-service teachers within colleges and schools of education, but the major thrust of teacher training activities has been in in-service workshops. Such workshops have been held in connection with the big cities program regularly for the past six years and have been financed by the National Science Foundation.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: There are Teacher's Guides prepared for use with the student materials.

S. PROJECT EVALUATION: Please refer to project literature for description of evaluation.

T. PROJECT PUBLICITY:

1. Davis, Robert B. "Report of the Syracuse University-Webster College Madison Project", American Mathematical Monthly, Vol. 71, No. 3 (March, 1964) pp. 306-308.

2. __________ "Goals for School Mathematics: The Madison Project View", Journal of Research in Science Teaching, Vol. 2, Issue 4 (December, 1964) pp. 309-315.

3. __________ A Modern Mathematics Program as it Pertains to the Interrelationship of Mathematical Content, Teaching Methods and Classroom Atmosphere (The Madison Project), Report submitted to the Commissioner of Education, U. S. Department of Health, Education & Welfare (1965).

4. __________ "Recent Activities of the Madison Project", American Mathematical Monthly (January, 1965).

5. __________ "Madison Project Activities for 1965-66: Report on Unfinished Business", American Mathematical Monthly, Vol. 73, No. 3 (March, 1966), pp. 301-304.

6. __________ "The Next Few Years", The Arithmetic Teacher, Vol. 13, No. 5 (May, 1966), pp. 355-362.

7. __________ The Changing Curriculum: Mathematics. Association for Supervision and Curriculum Development, NEA, 1967.

8. ________ Mathematics Teaching -- With Special Reference to Epistemological Problems. Monograph No. 1 (Fall, 1967), Journal of Research and Development in Education, College of Education, University of Georgia, Athens, Georgia 30601.

9. ________ A Modern Mathematics Program As It Pertains to the Interrelationship of Mathematical Content, Teaching Methods and Classroom Atmosphere. (The Madison Project). 2 vols., Report submitted to the Commissioner of Education, U.S. Department of Health, Education and Welfare, (Oct., 1967).

10. ________ "The War Against Mediocre Schools," The Ideal School, The Kagg Press, September, 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: The project has continued to operate in much the same manner as reported in 1968.

V. PLANS FOR THE FUTURE: The project hopes to be cooperating with other organizations in a concerted attack to combine workshops for school teachers with two other aspects of what amounts to the same problem: improving college methods and content courses for elementary school teachers, and the creation of appropriate curriculum materials and school experiences.

A. PROJECT TITLE: MATHEMATICS/SCIENCE EDUCATION LEARNING SYSTEM.

B. PROJECT DIRECTOR: Mr. M. Rex Arnett, Program Director, Mathematics/Science Education Learning System, Southwest Educational Development Laboratory, 800 Brazos Street, Austin, Texas 78701. (512)476-6861, Exts. 45 or 39.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Not answered.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. M. Rex Arnett, Program Director; Dr. Herbert F. Spitzer, Curriculum Specialist; Dr. E. Glenadine Gibb, Project Director; Dr. Thomas H. Scanniechio, Curriculum Development Specialist; Dr. Ann Howe, Science Coordinator; Miss Lenore John, Staff Development Specialist; Mrs. Socorro Lujan, Curriculum Writer; Mr. Kelly Hamby, IPI Specialist.

E. PROJECT SUPPORT:
1. Organizational agency: Southwest Educational Development Laboratory.
2. Funding agencies: NSF, TEA, Title IV of Education Act.

F. PROJECT HISTORY:
1. Principal originator: Dr. E. Glenadine Gibb.
2. Date and place of Initiation: 1966; Southwest Educational Development Laboratory.
3. Overall project purpose: Mathematics curriculum and staff improvement for economically disadvantaged populations and for culturally different groups.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Development of a mathematics/science education learning system responsive to needs, abilities, strengths, and weaknesses of economically disadvantaged and culturally different groups. Components of the learning system to be developed through research, original development, and adaptation are: curriculum materials, staff development, community-parent involvement activities, and learning ecology.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Lectures, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Pre-school mathematics and science (initial development 1970-71); mathematics (grades 1-8)

K. MATERIALS PRODUCED:

1. Mathematics Grades 1-8, Pupil and Teacher developmental edition.

2. Supplementary Mathematics for Migrant Mexican American children Grades 1-3

L. MATERIALS AVAILABLE FREE: No program materials are available during current year as all are in design test phase. Program information is presented in the Mathematics/Science Education Learning System Brochure, Southwest Educational Development Laboratory, Commodore Perry Hotel, Suite 550, 800 Brazos St., Austin, Texas 78701.

M. MATERIALS PURCHASABLE: None at present time.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English (Supplementary materials for Mexican-American children also in Spanish)

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Spanish.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Staff development materials for elementary mathematics teachers.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Under pilot test 98.

2. Number of students involved: 3460.

3. Number of schools involved: 5 school districts.

4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.

5. Name and location of selected schools where the course is being taught: East Baton Rouge Parish Schools, El Paso Independent School District, and various schools in Rio Grande Valley in cooperation with Region One Educational Service Center, Edinburg, Texas.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Materials not released to public. Teachers using materials in pilot testing are served by one consultant visit per month with additional consultant visits by request of teachers.

2. Activities conducted for pre-service and in-service teacher training: Pre-service workshops are conducted prior to the school year financed by SEDL. In-service activities are conducted monthly by staff and site consultants.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Mathematics Grade 1-8 materials include teacher editions which are used in pre-service and in-service activities.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies:
   (a) Anderson, James G., and Johnson, William H. "Sociocultural Determinates of Achievements Among Mexican American Students." (April 1968)
   (b) Anderson, James G., and Johnson, William H., et al. "Southwest Educational Development Laboratory El Paso Mathematics Project Preliminary Report." (September 1968)
   (c) Anderson, James G., and Johnson, William H. "Social and Cultural Characteristics of Mexican American Families in South El Paso, Texas." (December 1968)
   (d) Anderson, James G., Johnson, William H., and Lange, Robert. "Mexican American Students in a Metropolitan Context: Factors Affecting the Social-Emotional Climate of the Classroom." (July 1969)
   (e) Anderson, James G., and Evans, Frank B. "Achievement and the Achievement Syndrome Among Mexican American Youth." (September 1969)
   (f) Anderson, James G. "Teachers of Minority Groups: The Origins of Their Attitudes and Instructional Practices." (September 1969)
   (g) Anderson, James G. "Patterns of Achievement Among Mexican American Students." (October 1969)
   (h) Anderson, James G. "Differences Between Obtained and Anticipated Grade Placement by Area." (November 1969)
   (i) Anderson, James G. "Factors Affecting Achievement Among Mexican Americans in a Metropolitan Context." (December 1969)
   (j) Enoch, J. Rex, Gottfried, Nathan W., and Savells, Jerald O. "A Report of the East Baton Rouge Parish Mathematics Project." (Identification of factors in the background of disadvantaged children which might relate to their performance in mathematics and a comparison study between the use of adapted materials and school-adopted textbooks.) (October 1969)

These investigations were designed to ascertain influences in the acquisition of mathematics. Socio-cultural factors, identified as possibly affecting school achievement and mathematics in particular were (1) family background; (2) mathematics curriculum; (3) individual attitudes and aptitudes of children; (4) individual attitudes of teachers towards teaching, towards teaching mathematics and towards teaching mathematics to disadvantaged children; (5) individual teacher's educational background, including knowledge in mathematics and the teaching of mathematics; and (6) interaction between teacher and children in the mathematics classroom.

Although more specific information is included in the reports as named above, below are listed some of the findings:

(a) Family Influence

Mexican American

(1) Parents are highly desirous that their children obtain a high school education. (Over 80 percent of the mothers and 69 percent of the fathers of the 481 families interviewed indicated such.) Also 60 percent indicated that they would like to see their children attend college.

(2) Evidence to suggest that while placing a high value on formal education, little is done to assist their children in school. Lack of direct support of school is also suggested by the infrequent participation of parents in parent events sponsored by the school.

(3) Slightly more than half of the families interviewed felt that their children received frequent encouragement in school.

(4) Only 20 percent of families interviewed felt that teachers were willing to help their children.

Black and Anglo (All Negro, all Anglo, mixed classes)

(1) Responses from parents were generally quite favorable toward the school but the question of the reliability of their responses has been raised since families knew that the interviewers were regarded as representatives of the school.

(2) When asked what they considered to be the most important reason for a good education, most responses were classified as strictly utilitarian, although white mothers were most likely to emphasize some academic value.

(3) There was a strong emphasis placed on the value of obtaining a college education of the part of both races.

(4) Parental involvement was lowest for mixed schools of black and white.

(5) Twenty-seven percent of families interviewed (480) felt that children often have trouble with mathematics because the teachers try to make a simple subject too hard.

(6) Evidence from relating a measure of mathematics learning in the home with performance of children in mathematics in the school suggests that parents might

influence their children's performance more in the earlier years of schooling.

(b) Individual student attitudes and aptitudes - Mexican American (These factors were not investigated for black and Anglo populations.)

(1) General level of intellectual ability as measured by a test of non-verbal ability is substantially below that of other students.

(2) Achievement motivation appears to be strongly related to the amount of independence training experienced in the home. Mexican-American children reported experiencing significantly less independence training than their Anglo peers.

(3) Mexican Americans were more fatalistic about their future and were more skeptical about the value of planning ahead than were their Anglo peers.

(4) Achievement in mathematics appears to be related to the students' own desire to achieve in school. Moreover, achievement in both English and mathematics appears to be strongly related to the students' self concept of ability.

(c) Teachers (71)

(1) Teachers whose academic program has included a great deal of formal mathematics or who have attended summer institutes in mathematics education feel that mastery of subject matter is relatively more important than developing a warm, personal relationship with their students.

(2) Ten of the 71 teachers feel that their major responsibility is to transmit knowledge and that they should avoid dealing with students who experience psychological difficulties.

(3) Teachers who express concern about quality of home life of their students are generally more willing to teach in schools that offer special programs for culturally different children.

(4) All elementary teachers and most of the secondary teachers indicated that they strictly followed the textbook in their teaching.

(d) Interaction between teacher and children in the mathematics classroom. Based on four observations of the teaching of each of 71 teachers it was found that:

(1) The verbal behavior in the primary grade classrooms is much less dominated by the teacher than in the intermediate or secondary classroom. As might be expected, the proportions of teacher talk is highest in the high school.

(2) Elementary teachers spend much time in giving directions. However, they place a high premium on affective relations with students and were more indirect in the classroom.

(3) High school teachers were most direct and dominative in the classroom. These teachers spend a great deal of time lecturing.

(e) Teacher factors related to success in mathematics

(1) At the elementary level students in classrooms where the teacher spends less time talking and permits students to ask questions and express opinions out-performed their peers in the more teacher-dominated classrooms on both the test of Arithmetic Fundamentals and the test of Arithmetic Reasoning.

(2) Students in the teacher-dominated sixth and seventh grade classrooms scored higher on the two arithmetic achievement tests than did their peers in classrooms where students were encouraged to express themselves.

(3) At the high school level students who were encouraged to express themselves out-performed their fellow students who experienced teacher dominance.

(4) In general, the greater the teacher's mathematics background, the higher the student's achievement test scores.

(5) Students in higher social class families assigned to teachers who devote more time to encouraging and developing students achieve at higher levels on both achievement tests.

(6) Students from lowest social class areas achieve at higher levels on both achievement tests when there is less effort on the part of the teacher to assist students in developing their ideas.

(f) Other observations

(1) At the high school level the effect of social class is clearly evident. Area III (high) out-perform Area II students, who in turn out-perform Area I (low) students.

(2) Students who are taught by teachers who strongly support compensating and bilingual programs do not achieve at the same level as their peers.

The above reflects only a sampling of the findings. More comprehensive summaries are to be found in the reports.

3. Additional evaluative data available to interested individuals: Not at the present time. All evaluation activities for design test stage are strictly in-house.

T. PROJECT PUBLICITY:
Robinson, Pat, "Mathematics Education for Mexican Americans," The Instructor.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:
1. Development of mathematics/science curriculum, grades 1-3.
2. Development of individualized programmed instruction modules for economically disadvantaged and culturally different populations.
3. Development of extensive staff development program for elementary mathematics teachers.

A. PROJECT TITLE: MINNESOTA MATHEMATICS AND SCIENCE TEACHING PROJECT (MINNEMAST).

B. PROJECT DIRECTOR: James H. Werntz, Jr., Professor of Physics, Center for Curriculum Studies, University of Minnesota, Minneapolis, Minnesota 55455. (612)373-4537.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: None, project terminates September 30, 1970.

D. PRINCIPAL PROFESSIONAL STAFF: Roger Jones, Director of Science; Mason R. Boudrye, Administrator; Wells H. Hively, Research Director.

E. PROJECT SUPPORT:
1. Organizational agency: University of Minnesota.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originator: Paul C. Rosenbloom, Professor of Mathematics.
2. Date and place of Initiation: 1961; University of Minnesota.
3. Overall project purpose: To produce coordinated mathematics and science curriculum for grades K-6.

G. PRESENT COMMERCIAL AFFILIATIONS: Textbook in mathematics: "Ideas in Mathematics", published by W.B. Saunders Co., Philadelphia, 1970.

H. PROJECT OBJECTIVES: Process acquisition; attitudinal changes; scientific literacy.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Coordinated mathematics and science, grades K-3; college level, teacher preparatory.

K. MATERIALS PRODUCED:
1. Minnemath Reports (terminated 1969).
2. Coordinated Units: 1-30 for grades K-3.
3. Overview.
4. Living Things in Field and Classroom.
5. Extending Man's Senses.
6. Ideas in Mathematics.
7. Questions and Answers About MINNEMAST.

L. MATERIALS AVAILABLE FREE: Item No. 7. Address the Director.

M. MATERIALS PURCHASABLE: Items No. 2 - No. 5, Information available by writing the Director. Item No. 6, from W.B. Saunders Co., Philadelphia.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Pre-service and in-service teacher aids, see below.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 10 school systems.
2. Number of students involved: 2,500.
3. Number of schools involved: 125.
4. Total number of teachers using any of the materials: 500.
5. Total number of students using any of the materials: 50,000+.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Falls Church, Virginia; Houston, Texas; San Diego, California; Minneapolis, Minnesota; Caldwell, Idaho; Springfield, Massachusetts; Brookfield, Missouri.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Write: Professor Alan Humphreys, College of Education, University of Minnesota, Minneapolis, Minnesota 55455.
2. Activities conducted for pre-service and in-service teacher training: Summer workshops, supported by the National Science Foundation, in various areas. Information available from Alan Humphreys. (See above).
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Pre- and in-service packages (similar). At present we have about 1/2 of the total package developed. We estimate that the manuals for teachers and undergraduates will cost about $1.75 each and the materials (which are available locally) about $25.00. In addition, we plan to have tapes, slides, and 16mm films (tapes both audio and video) available from the project headquarters for transportation costs both ways.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies:
   a. Hively, W., H. Patterson, and Sara H. Page, "A Universe-Defined System of Arithmetic Achievement Tests", Journal of Educational Measurement, Vol. 5, No. 4, Winter 1968, p. 275.
   b. Johnson, P.E., "On the Communication of Concepts in Science", Journal of Educational Psychology, 1969, Vol. 60, pp. 32-40.
   c. Murray, F., "Reversibility Training in the Acquisition of Length Conservation", Journal of Educational Psychology, Vol. 59, No. 2, 1968, pp. 82-87.
   d. Murray, F., "Operational Conservation of Illusion-Distorted Length", British Journal of Educational Psychology, Vol. 38, Part 2, June 1968, pp. 189-193.
3. Brief abstract of in-house or unpublished research:
   a. Reports on the direct evaluation of most of the K-3 units have been completed. These reports contain a detailed description of the test domain for the unit and a summary of the results obtained during the field test of the unit.
   b. The MINNEMAST Experiment with Domain Referenced Achievement Testing Systems. A detailed description of the evaluation procedures used in the MINNEMAST evaluation project.
   c. A Curriculum Evaluation and Revision Based on Domain Referenced Achievement Test Systems. This paper describes how an individual unit (Unit 2) was evaluated and revised based upon the results of that evaluation. It also presents the results of a subsequent evaluation.
   d. The Use of Sample Test Items As Objectives for Instruction -- The Effects Upon the Teacher and Upon the Learner. This paper describes a study in which six kindergarten teachers were provided with sample test items for a MINNEMAST unit while a matched sample of six other teachers were provided with the unit only. The study sheds some light on the role of objectives in instruction.
   e. Future Uses of Domain Referenced Achievement Testing Systems. This paper outlines some of the potential uses for Domain Referenced Achievement Testing Systems. It also points to some of the pitfalls in those applications.
   f. An Introduction to Domain Referenced Achievement Testing. An overview of the psychological basis for the evaluation model utilized in the MINNEMAST Project. The paper also includes a glossary of terms as utilized in the testing model.
   g. The Experimental Analysis of Educational Objectives. PhD Thesis, University of Minnesota, George Rabehl. The paper presents the philosophical and scientific rationale for casting the formulation of educational objectives into an experimental context. It shows that the specification of relevant and irrelevant conditions is not a once and for all activity but requires instead a continuing

self-corrective process involving the steps of hypothesis, application, analysis, and a reformulation of educational intent. What is achieved is a framework for analyzing, describing, and comparing curricular materials; for making inferences from student performances beyond a finite set of items; and finally a basis for proposing and interpreting psychological studies in terms of the actual characteristics of educational requirements.

h. A Comparison of Two Conceptual Frameworks for Teaching the Basic Concepts of Rational Numbers. PhD Thesis, University of Minnesota, Donald Sension. This paper compares the effects of two physical models for teaching fraction concepts on student performance. It utilizes a Domain Reference Achievement Testing System.

i. An Investigation of The Effectiveness of Independent Study of Novel Mathematics Material in the Elementary School. PhD Thesis, University of Minnesota, Lester Becklund. The paper presents the results of a study which examined the role of the teacher in presenting some novel mathematics. A MINNEMAST game unit on vectors and transformations was used.

j. Arithmetic Achievement Test Performance of MINNEMAST Mathematics Pupils in the Third and Fourth Grades. This paper presents a summary of the results of a two year study of the performance of pupils in the MINNEMAST mathematics program on selected arithmetic achievement tests.

k. The Relationship Between Concepts of Conservation of Length and Number. The purpose of this study was to describe the relationship between attainment of concepts of conservation of length and number. The concepts were embodied in a compound number-length task. Two aspects of performance were investigated: (1) the comparative performance of solvers and non-solvers on conservation of number and conservation of length, and (2) the stability of performance characteristics across the age span sampled. Fifty-five children, 21 females and 34 males, ages 6 through 9 years, participated in the study.

4. Additional evaluative data available to interested individuals: All of the reports listed above plus others which are being written may be obtained from the Director.

T. PROJECT PUBLICITY:

1. Ahrens, R.B., "MINNEMAST -- The Coordinated Science and Mathematics Program", Science and Children, 2: 16-18 (February 1965).
2. Bray, Edmund C., "MINNEMAST, An Elementary Math-Science Program", School Science and Mathematics, June 1969.
3. Bray, Edmund C., "The MINNEMAST Elementary Mathematics-Science Program", The Physics Teacher, May 1968.
4. Maxwell, Graham, "Some Notes and Comments on the Minnesota Mathematics and Science Teaching Project", The Australian Mathematics Teacher, March 1969.

5. Rising, Gerald R., "Research and Development in Mathematics and Science Education at the Minnesota School Mathematics and Science Center and the Minnesota National Laboratory", School Science and Mathematics, 65: December 1965, pp. 811-814.
6. Rosenbloom, P.C., "The Minnesota Mathematics and Science Teaching Project", Journal of Research in Science Teaching, (1963), pp. 276-280.
7. Subarsky, Zachariah, "Curriculum Construction for K-6 Science and Math -- a Strategy", Science and Children, November 1968.
8. Subarsky, Zachariah, "The Systems Concept in Science", The Instructor, January 1968.
9. Victor, Laurence, "Systems: An Organizing Principle for Science Curricula", Science and Children, January/February 1968, pp. 17-20.
10. Werntz, James H., "A Style of Understanding", Nature and Science, Vol. 4, No. 12, March 13, 1967.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:
Negotiation for commercial publication of materials.

V. PLANS FOR THE FUTURE:
Completion of Grade 3 coordinated units.
Close out present phase by September, 1970.
Continued availability of materials. Write to Director.

A. PROJECT TITLE: NATURAL SCIENCE CURRICULUM FOR THE NON-SCIENCE MAJOR.

B. PROJECT DIRECTOR: Gus John Demas, Associate Professor, Department Chairman, Division of General Education, Center Campus, Macomb County Community College District, 16500 Hall Road, Mt. Clemens, Michigan 48043. (313)465-2121, Ext. 314.

C. PROJECT HEADQUARTERS:

1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Unique multi-purpose science laboratories with centrally located preparation and storage area which utilize the tote tray system of use and retrieval.

D. PRINCIPAL PROFESSIONAL STAFF: Gus John Demas, Department Chairman, Associate Professor; Joseph Allen, Instructor; Sylvia Bartalucci, Instructor; Doris Bell, Assistant Professor; William Bonaudi, Assistant Professor; Douglas Dassow, Associate Professor; Michael Rickard, Instructor; Peter Tomlinson, Assistant Professor; Deborah Trumbull, Instructor.

E. PROJECT SUPPORT: Funds are internal through the Board of Trustees, Community College, District of Macomb County.

F. PROJECT HISTORY:

1. Principal originators: Faculty and administrators that studied and initiated the general education philosophy; Charles D. Eisemann (Division Dean), Gus John Demas (Department Chairman of Science and Mathematics), Douglas Dassow (Curriculum Development Coordinator), Sylvia Bartalucci, William Bonaudi, Michael Rickard, and Peter Tomlinson (Workshop Participants).
2. Date and place of Initiation: July 1, 1968; Macomb County Community College.
3. Overall project purpose: This program was developed and implemented specifically to meet the needs of the community college student. It has been concluded, through research, that the majority of community college students will not succeed in the more traditional liberal arts transfer programs (60-70% attrition); thus the Division of General Education at the Center Campus of Macomb County Community College will offer a three-track science sequence to accomodate students with different kinds of aspirations and levels of ability. The sequence consists of a one-year general education experience, which along with natural science, includes humanities, social science, and communications. The students are scheduled according to the block system, 24 per block, and the staff who teach the same blocks comprise a vertical team which meets weekly to coordinate and integrate the curriculum as well as continue the innovative and experimental process.

The primary objectives of the program are to illustrate, with special emphasis on the application of knowledge to the students' everyday lives, as well as increase the probability of academic success.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:

1. To enable the student to better visualize the useful aspects of science as it involves him.
2. To increase the student's ability to solve problems by utilizing scientific methodology.
3. To enable the student to understand that the various areas of science are interrelated and interdependent.
4. To enable the student to understand that science is interrelated with other disciplines.
5. To help develop and encourage curiosity within the student about his environment.
6. To enable the student to pursue his curiosity so that he reacts by becoming involved in everyday problems.
7. To enable the students to formulate, evaluate and communicate their opinions concerning scientific information.
8. To enable the student to critically evaluate scientific information appearing in the mass media.
9. To understand that science is both a process and a product.

The unique characteristic of this project is that each and every course is developed according to an instructional design system approach package which includes pre-tests (entry skills), enabling objectives, performance goals, appropriate media, and post-tests (exit skills). Thus, there is a real attempt not only to present science from the standpoint of its relevancy and daily applicability but also to better meet each student's individual needs. They are stated in the program rationale of the Department Curriculum Guide and Divisional Progress Report.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent Study, Programmed Instruction, Laboratory Investigations, Lectures, Seminars, Discussion Groups, Computer-Assisted Instruction, Closed Circuit Television.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Physical and biological science integrated through the themes of "What Am I" and "Who Am I." College level, transferable science credit for the non-science major at various ability levels; remedial to college-parallel.

K. MATERIALS PRODUCED: Natural Science 101, 102, 110 and 120 Curricula Guides, including course syllabi, rationales, design criteria, performance goals, pre- and post- tests, and other instruments for evaluation.

L. **MATERIALS AVAILABLE FREE:** Item one, contact project director.

M. **MATERIALS PURCHASABLE:** None.

N. **LANGUAGE IN WHICH MATERIALS WERE WRITTEN:** English.

O. **LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED:** None.

P. **ADDITIONAL MATERIALS BEING DEVELOPED:** Appropriate textbooks, anthologies, and laboratory manuals for each specific course.

Q. **PROJECT IMPLEMENTATION:**

1. Number of teachers who have adopted the entire course: 8.
2. Number of students involved: 620.
3. Number of schools involved: One.
4. Total number of teachers using any of the materials: 6.
5. Total number of students using any of the materials: 620.
6. Totals stated in 1, 2, 3, 4 and 5 are definitive.
7. Name and location of schools where the courses are being taught: Center Campus, Macomb County Community College, 16500 Hall Road, Mt. Clemens, Michigan 48043.

R. **TEACHER PREPARATION:**

1. Consultant services available for teachers using the materials: Staff available upon request from within as well as outside the institution.
2. Activities conducted for pre-service and in-service teacher training: We organize and implement in-service training seminars for our own staff dealing with the implementation and development of an interdisciplinary approach to science. Financed by institutional and Title III funds.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Various course instructional packets with instructor's guide available upon request. Approximate cost will vary according to specific course.

S. **PROJECT EVALUATION:**

1. Has the effectiveness of the materials been evaluated: Yes, by project staff.
2. Pertinent published research studies: None published as yet.
3. Brief abstract of in-house or unpublished research: Evaluation not complete at this date.
4. Additional evaluative data available to interested individuals: Upon written request to project director, data are available.

T. **PROJECT PUBLICITY:** None published as yet.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

1. Completion of detailed evaluation research and analysis (June, 1970).
2. Publication of evaluation results (June, 1970).
3. Completion and publication of all course instructional materials; textbooks, media lists, laboratory manual, etc. (Summer, 1970).
4. Will sponsor October, 1970 conference dealing with Natural Science Systems Curricula for the non-science major. Details will be forthcoming on brochures available upon request to project director.

A. PROJECT TITLE: NEBRASKA PHYSICAL SCIENCE PROJECT (NPSP).

B. PROJECT DIRECTOR: Dr. Donald W. McCurdy, Assistant Professor of Secondary Education, University of Nebraska, Lincoln, Nebraska 68508. 472-3151.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Pilot School Classes.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. E. J. Zimmerman, Professor of Physics; Dr. Craig Eckhardt, Asst. Prof. of Chemistry; Dr. Donald McCurdy, Asst. Prof. of Ed.; Mr. Robert Fisher, Supervisor of Science; (all of the University of Nebraska) Dr. Dale Rathe, Science Consultant, Lincoln Public Schools; Fred Curtis, Science Consultant, State Department of Education; Douglas Wilson, Physics Teacher, East High, Lincoln, Nebraska.

E. PROJECT SUPPORT:
1. Organizational agencies: Nebraska State Department of Education, University of Nebraska, Lincoln, Nebraska Public Schools.
2. Funding agencies: National Science Foundation; Nebraska State Department of Education; University of Nebraska; Lincoln, Nebraska Public Schools.

F. PROJECT HISTORY:
1. Principal originators: Dr. Donald McCurdy; Dr. Dale Rathe; Mr. Robert Fisher; Mr. Douglas Wilson.
2. Date and place of Initiation: August 1968; Lincoln, Nebraska.
3. Overall project purpose: To make possible the situation whereby teachers, scientists, and education specialists could work together to devise a program which would improve the teaching-learning of physics and chemistry.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:
1. To develop a two-year integrated physics, chemistry sequence for secondary schools, making almost exclusive use of existing curriculum materials.
2. To "package" this program into units through which a student can proceed at his own rate.
3. To make use of behavioral objectives in each lesson to guide the teachers and students.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Seminars, Discussion groups.

J. **SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS:** Chemistry and physics in high school.

K. **MATERIALS PRODUCED:**

1. Unit I - Orientation - Student Guide (2 packets).
2. Unit II - Atomic Theory - Student Guide (5 packets).
3. Unit III - Mechanics - Student Guide (5 packets).
4. Unit IV - States of Matter - Student Guide (4 packets).
5. Unit V - Electrical Nature of Matter - Student Guide (3 packets).
6. Unit VI - Chemical Reactions - Student Guide (5 packets).
7. Teachers Guide - For Units I through VI.
8. Pamphlet - The Nebraska Physical Science Project.

L. **MATERIALS AVAILABLE FREE:** Item 8 available from project headquarters.

M. **MATERIALS PURCHASABLE:** None as yet.

N. **LANGUAGE IN WHICH MATERIALS WERE WRITTEN:** English.

O. **LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED:** None.

P. **ADDITIONAL MATERIALS BEING DEVELOPED:** Workshop of summer 1970, will develop the second half of the planned program of studies.

Q. **PROJECT IMPLEMENTATION:**

1. Number of teachers who have adopted the entire course: 10.
2. Number of students involved: 400.
3. Number of schools involved: 8.
4. Total number of teachers using any of the materials: 10.
5. Total number of students using any of the materials: 530.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive: Definitive.
7. Name and location of selected schools where course is being taught: Lincoln East, 70th and "A", Lincoln, Nebraska 68510; Grand Island High, Grand Island, Nebraska 68801; Acquinas High, David City, Nebraska 68633.

R. **TEACHER PREPARATION:**

1. Consultant services available for teachers using the materials: The NPSP staff are available for helping individual pilot teachers with problems.
2. Activities conducted for pre-service and in-service teacher training: Most of the pilot teachers using the material were participants in the workshop and thus, were co-authors of the material. Consultants were used on the workshop to train them. Other teachers have had orientation to the NPSP program from their teacher and the project staff in several one-day workshops.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes ; in progress by project staff.
2. Pertinent published research studies: None as yet.
3. Brief abstract of in-house or unpublished research: None completed as yet.
4. Additional evaluative data available to interested individuals: None as yet.

T. PROJECT PUBLICITY: McCurdy, Donald W. and Robert L. Fisher "Physical Science Project: An individualized two-year chemistry-physics course", The Science Teacher, Vol. 36, No. 9, December 1969, p. 60.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: All activities listed above in this report.

V. PLANS FOR THE FUTURE:

1. Pilot teacher conferences will continue.
2. A workshop is planned for summer 1970, to revise the published materials and to continue further development of the materials.

A. PROJECT TITLE: PATTERNS IN ARITHMETIC (PIA).

B. PROJECT DIRECTORS: Dr. Henry Van Engen, Developer, Curriculum and Instruction, University of Wisconsin, 257 Education Building, Madison, Wisconsin 53706. (608)262-1713.
Dr. Herbert J. Klausmeier, Director, Wisconsin Research and Development Center for Cognitive Learning, 1404 Regent Street, Madison, Wisconsin 53706. (608)262-4901.

C. PROJECT HEADQUARTERS:
1. Contact: Mr. James E. Walter, Director of Dissemination, Wisconsin Research and Development Center for Cognitive Learning, 1404 Regent Street, Madison, Wisconsin 53706. (608) 262-4901.
2. Special facilities or activities available for visitor viewing: A descriptive video tape is available from the Wisconsin Research and Development Center for Cognitive Learning. Preview materials are available from: National Instructional Television Center, Box A, Bloomington, Indiana 47401.

D. PRINCIPAL PROFESSIONAL STAFF: Not answered.

E. PROJECT SUPPORT:
1. Organizational agencies: School of Education, University of Wisconsin, Wisconsin Research and Development Center for Cognitive Learning.
2. Funding agencies: United States Office of Education.

F. PROJECT HISTORY:
1. Principal originator: Dr. Henry Van Engen.
2. Date and place of Initiation: September 1964; Madison, Wisconsin.
3. Overall project purpose: To develop a televised elementary modern mathematics program for grades 1-6.

G. PRESENT COMMERCIAL AFFILIATIONS: National Instructional Television Center, Box A, Bloomington, Indiana 47401.

H. PROJECT OBJECTIVES: To provide a complete course in arithmetic for the elementary school as a method of reorienting the mathematics program and of providing in-service work for teachers.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: T.V. presentations of content accompanied by student workbook and teacher's manual.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics grades 1-6, general population.

K. MATERIALS PRODUCED:
Grade 1: 32 15-minute video tapes.
1 pupil workbook. 1 teachers manual.

Grade 2: 48 15-minute video tapes.
1 pupil workbook.
1 teachers manual.
Grades 3-6: (Each grade) 64 15-minute video tapes
1 pupil workbook.
1 teachers manual.

L. MATERIALS AVAILABLE FREE: Reports from the Wisconsin Research and Development Center for Cognitive Learning.

M. MATERIALS PURCHASABLE: Program materials are rented or purchased from National Instructional Television Center. Contact Director for rental charges.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: About 10,000.
2. Number of students involved: Over 300,000.
3. Number of schools involved: Schools in 18 states.
4. Total number of teachers using any of the material: Not answered.
5. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
6. Name and location of selected schools where the course is being taught: Various educational television networks; Roanoke, Virginia; Eau Claire, Wisconsin, Laboratory School; Archdiocese of New York.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: None.
2. Activities conducted for pre-service and in-service teacher training: None.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:
1. Has the effectiveness of your materials been evaluated? Yes.
2. Pertinent published research studies: Technical Report No. 67, Objectives of Patterns in Arithmetic and Evaluation of the Telecourse for Grades 1 and 3; Working Paper No. 17, Patterns in Arithmetic, Grade 2: Field Testing 1967-68; Working Paper No. 18, Formative Evaluation of Patterns in

Arithmetic, Grade 5, 1967-68; Working Paper No. 20, A Comprehensive Look at Patterns in Arithmetic. Reports are available from the Wisconsin Research and Development Center for Cognitive Learning.

3. Brief abstract of in-house or unpublished research: None.
4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: Using Mass Communication Media to Improve Arithmetic Instruction - article in the February 1969 "Audiovisual Instruction" magazine.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Program completed June 1969. Printed materials now being revised.

V. PLANS FOR THE FUTURE: None at the present time.

A. PROJECT TITLE: PENNSYLVANIA NUCLEAR SCIENCE PROJECT (PNS).

B. PROJECT DIRECTOR: Mr. John J. McDermott, Science Education Advisor, Bureau of General and Academic Education, Pennsylvania Department of Education, P.O. Box 911, Harrisburg, Pennsylvania 17126 (717)787-7320.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director.
2. Special facilities or activities available for visitor viewing: Visits to pilot schools may be made through the Chief School Administrator.

D. PRINCIPAL PROFESSIONAL STAFF: Mr. Carl E. Heilman, Coordinator, Division of Science and Mathematics; Mr. Joseph E. Anthony, Science Education Advisor; Mr. William H. Bolles, Science Education Advisor; Dr. Irvin T. Edgar, Science Education Advisor.

E. PROJECT SUPPORT:
1. Organizational agencies: Division of Science and Mathematics, Bureau of General and Academic Education, Pennsylvania Department of Education.
2. Funding agencies: Pennsylvania Department of Education.

F. PROJECT HISTORY:
1. Principal originator: Pennsylvania Department of Education.
2. Date and place of Initiation: Materials preparation, June 1967; Initiation of pilot program: September 1969; Harrisburg, Pennsylvania.
3. Overall project purpose: To provide an enrichment program for science oriented students of high academic ability.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:
1. Cross disciplinary course, freely including areas of nuclear physics, nuclear and radiochemistry, radiation biology, and radioisotope applications.
2. Designed for science-oriented students of high academic ability.
3. Radiation characteristics and radioisotope methodology make up the bulk of the laboratories.
4. Course utilizes a systems approach, and is written in behavioral terms.
5. Achievement tests are specifically designed to measure the behavioral objectives.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Lectures, Seminars, Discussion groups, Computer assisted instruction in some cases, Methodological innovations by pilot program teachers are encouraged.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: High ability students in grades 11 and 12 who have completed both chemistry and physics, or who have completed one and are enrolled in the other. Mathematics background beyond Algebra II.

K. MATERIALS PRODUCED:
1. PDE Publication: Nuclear Science: A High School Course.
2. Achievement tests in Nuclear Science.
3. PNS Newsletter.

L. MATERIALS AVAILABLE FREE:
1. Nuclear Science: A High School Course.
2. PNS Newsletter
(Address requests to project director)

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
1. Publication: Audiovisual Aids for Nuclear Science.
2. Laboratory Exercises in Nuclear Science.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 27.
2. Number of students involved: 269.
3. Number of schools involved: 21.
4. Total number of teachers using any of the materials: 29.
5. Total number of students using any of the materials: 385.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Definitive.
7. Name and location of selected schools where course is being taught: Gateway High School, Monroeville, Pa.; Thomas Jefferson Senior High, Jefferson Township, Pa.; Pine-Richland High School, Richland Township, Pa.; West York High School, York, Pa.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Advisers from Pennsylvania Department of Education; Department of Nuclear Engineering, The Pennsylvania State University, Dr. Warren F. Witzig, Chairman.
2. Activities conducted for pre-service and in-service teacher training: Pre-service workshop: 1 week (all day); Summer Institute (4 weeks), funded by NSF.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: None to date have been published.
3. Brief abstract of in-house or unpublished research: Data on student achievement and any alteration in student attitudes toward science will be available after June 30, 1970.
4. Additional evaluative data available to interested individuals: Contact Director for additional data.

T. PROJECT PUBLICITY: None to date.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not in 1968 Report.

V. PLANS FOR THE FUTURE:

1. May, 1970: Twenty additional pilot schools will be selected.
2. June, 1970: Writing and revision conference.
3. August, 1970: Four-week training workshop.

A. PROJECT TITLE: PENNSYLVANIA RETRIEVAL OF INFORMATION FOR MATHEMATICS EDUCATION SYSTEM (PRIMES).

B. PROJECT DIRECTOR: Emanuel Berger, Bureau of Research; Doris E. Creswell, Bureau of General and Academic Education, Pennsylvania Department of Education, Box 911, Harrisburg, Pennsylvania 17126. (717)787-6016.

C. PROJECT HEADQUARTERS:

1. Contact: Either director.

2. Specific facilities or activities available for visitor viewing: At the project headquarters: file of sample microfilm aperture cards; book form indexes; microfilm reader-printer; slide-tape program and filmstrips describing the project; library of 35 basal elementary math texts; selected manipulative devices; 8 sets of standardized tests; curriculum practices survey for the local education agencies of Pennsylvania on ACME Visible Records.

D. PRINCIPAL PROFESSIONAL STAFF: Emanuel Berger, director; Doris E. Creswell, co-director; Dorothy H. Hoy, mathematics education adviser; Patricia Starke, educational research intern; Carl A. Guerriero, mathematics education adviser; Thomas N. McCreary, mathematics education adviser; Russell A. Dusewicz, research associate; Robert Goldberg, systems analyst; David Kerr, systems analyst; Robert Simmons, programmer; Edwin Smith, director, PRIMES regional center, Westmoreland County Public Schools; Everett Landin, director, PRIMES regional center, West Chester State College; Anthony Pinnie, co-director, PRIMES regional center, Cheyney State College; Judith Cope, PRIMES adviser, Westmoreland County Public Schools; Michael Montemuro, PRIMES adviser, West Chester State College; Mildred Reigh, PRIMES adviser, Indiana University of Pennsylvania, Content analyst; Donald Sapko, PRIMES adviser, Westmoreland County Public Schools.

E. PROJECT SUPPORT:

1. Organizational agencies: Pennsylvania Department of Education; Westmoreland County Public Schools; West Chester State College; Indiana University of Pennsylvania.

2. Funding agencies: Pennsylvania Department of Education; U. S. Office of Education.

F. PROJECT HISTORY:

1. Principal originators: Emanuel Berger and Doris E. Creswell.

2. Date and place of Initiation: January, 1965; Department of Education, Commonwealth of Pennsylvania.

3. Overall project purpose: (1) To advise school districts in developing their math curriculum; (2) to assist school districts in implementing flexible grouping practices using a variety of instructional materials in teaching elementary

school math.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: This project is unique in that it has developed a comprehensive data base of information stored on a computer which can be processed to the specifications of local school districts. Also, a set of systematic procedures with accompanying forms is used by the school districts to produce one or more of the following curriculum products:

1. curriculum description
2. curriculum evaluation
3. scope and sequence
4. materials selection
5. curriculum guide
6. testing program description
7. instructional model for flexible grouping

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Systems approach to curriculum development.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Elementary school mathematics; grades K-8; ages 5 - 14.

K. MATERIALS PRODUCED:

1. Slide/tape, filmstrip/tape describing project.
2. Book-form indexes for:
    a. Basal textbook series.
    b. Standardized tests.
3. Authority lists used to catalog the lessons:
    a. Content.
    b. Behavioral objectives.
    c. Vocabulary.
4. Curriculum Procedures Manual.
5. Curriculum Practices Survey (Pennsylvania Public Schools).
6. Research studies microfilm file, 1909-1968.

L. MATERIALS AVAILABLE FREE:

3a. Content Authority List (Abridged).
5. Curriculum Practices Survey.

M. MATERIALS PRUCHASABLE: Write to project headquarters for price list.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. Descriptive catalog of mathematics films.
2. Descriptive catalog of selected manipulative devices.

3. Book-form index of standardized tests.
4. A PRIMES Glossary.
5. Abstracts of research studies, 1968.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire procedures: 300.
2. Number of students involved in using materials directly: 225 (one school, K-6).
3. Number of schools involved: 23 school districts.
4. Total number of teachers using any of the materials: 1,950.
5. Total number of students using any of the materials: 57,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? 1 and 2 - definitive; 3, 4, and 5 - estimated.
7. Name and location of selected schools where the program is being used: The following Pennsylvania school districts: Armstrong, Ford City; Burrell, Lower Burrell; California Area, California; Chester Township; Eastern Lancaster County, New Holland; Franklin Regional, Murrysville; Kiski, Vandergrift; Greensburg-Salem, Greensburg; Jeanette City, Jeannette; Leechburg Union, Leechburg; Marion Center Area, Marion Center; Monessen, Monessen; Neshaminy, Langhorne; Owen J. Robert, R. D. 1, Pottstown; Penn-Trafford, Harrison City; Southmoreland, Scottdale.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: A PRIMES consultant is made available to meet the teachers at least once every two weeks. The resources and facilities of PRIMES offices are available at any time.
2. Activities conducted for pre-service and in-service teacher training: a. Pre-Service: Library of PRIMES materials is housed at Indiana University of Pennsylvania and at West Chester State College. Students use these materials in the course of student teaching, writing term papers, and working on special projects. Student teachers are assigned to schools working with PRIMES in developing and implementing curriculum. b. In-Service: Teachers are trained at their local school districts to use PRIMES materials. Cost: $500 - $1,000 consultant fees. An annual workshop is held for those who train teachers at Pennsylvania State Colleges.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Content Authority List, Curriculum Procedures Manual, Computer-produced indexes (See K).

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by outside committee appointed through the Pennsylvania Department of Education.

2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: Not answered.
4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY:
1. Pennsylvania Education -----------April-May, 1969.
2. Education Summary-----------------September 15, 1969.
3. Education Recaps (Educational Testing Service) October, 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not described in 1968 Report.

V. PLANS FOR THE FUTURE:

Publications: Research design monograph; behavioral objectives monograph. Development of a training program for teachers in the use of behavioral objectives. Descriptive report and evaluation of instructional model for flexible grouping.

Planning Conferences: Pennsylvania state college mathematics department faculty and mathematics coordinators training conference for use of project materials and procedures.

A. PROJECT TITLE: PHYSICAL SCIENCE II (PS II).

B. PROJECT DIRECTOR: Dr. Uri Haber-Schaim, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160. (617)969-7100.

C. PROJECT HEADQUARTERS:

1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: A number of people have worked on the project at various times. The preface to the textbook includes acknowledgments.

E. PROJECT SUPPORT:

1. Organizational agency: Education Development Center.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:

1. Principal originators: The preface to the textbook includes acknowledgments.
2. Date and place of initiation: 1967; Education Development Center.
3. Overall project purpose: To develop a follow-up course to extend the purpose of the Introductory Physical Science course constructed by the Physical Science Group of Education Development Center.

G. PRESENT COMMERCIAL AFFILIATIONS: Contract presently under negotiation with Prentice-Hall.

H. PROJECT OBJECTIVES: The same as for the Introductory Physical Science Course.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, Laboratory investigations, Lectures, Pre- and Post-lab discussions.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Introductory Physical Science is a prerequisite. This second year course in physical science begins with a study of heat. Conservation of electric charge follows. The relationship between charge on the electron and chemical formulas is then investigated. The heating effects of flowing electric charge leads to the concept of electric work. With this background a series of experiments leads, without the necessity of studying kinematics and Newton's Laws, to the conservation of energy on both the microscopic and atomic scale. Finally, the idea of irreversible energetic processes is introduced through the study of the interaction of large numbers of molecules. This has been piloted successfully with students of average ability and above in grades 9 and 10, and in grades 11 and 12 with students who do not take chemistry and/or physics.

K. MATERIALS PRODUCED:
1. Textbook, preliminary edition.
2. Teacher's Guide, preliminary edition.
3. Laboratory equipment and apparatus.
4. Achievement Tests.
5. Laboratory Tests.
6. Descriptive brochure.

L. MATERIALS AVAILABLE FREE:
Item 6, Physical Science Group, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160.

M. MATERIALS PURCHASABLE:
Materials are available only to teachers trained in an approved institute or workshop.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED:
Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 36.
2. Number of students involved: 2,000.
3. Number of schools involved: 30.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: The preface to the preliminary edition of the textbook lists some of the pilot schools.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: None, however, the Physical Science Group is instrumental in setting up workshops and recommending workshop instructors.
2. Activities conducted for pre-service and in-service teacher training: Leadership conference for local workshop instructors.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: See answer to M.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: Not answered.

3. Brief abstract of in-house or unpublished research: Not answered.

T. PROJECT PUBLICITY: Not answered.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Not answered.

A. PROJECT TITLE: PHYSICAL SCIENCE FOR NONSCIENCE STUDENTS (PSNS).

B. PROJECT DIRECTOR: Lewis G. Bassett, Emeritus Professor of Chemistry, Rensselaer Polytechnic Institute, Troy, New York 12181. (518)270-6341.
Walter Eppenstein, Professor & Assoc. Chairman of Physics, Rensselaer Polytechnic Institute, Troy, New York 12181. (518)270-6419.

C. PROJECT HEADQUARTERS:
1. Contact: Before September 1970: Professor Bassett. After September 1970: A.A. Strassenburg, American Institute of Physics, State University of New York at Stony Brook, Stony Brook, New York 11790. (516)751-8300.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Lewis G. Bassett, Director; Walter Eppenstein, Co-director; A.A. Strassenburg, Assoc. Director; Elizabeth A. Wood, Assoc. Director; Robert R. Sells, Assoc. Director.

E. PROJECT SUPPORT:
1. Organizational agencies: Commission on College Physics, Advisory Council on College Chemistry.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Commission on College Physics and Advisory Council on College Chemistry.
2. Date and place of Initiation: April 1965; Rensselaer Polytechnic Institute.
3. Overall project purpose: To satisfy a need for a one-year laboratory-oriented course in physical science for prospective elementary school teachers.

G. PRESENT COMMERCIAL AFFILIATIONS: Textbook publisher: John Wiley and Sons, Inc., New York City. Apparatus supplier: Damon Educational, Inc., Needham, Massachusetts.

H. PROJECT OBJECTIVES: The objective is to produce materials for a one-year laboratory-oriented, college level physical science course for nonscience majors. The course is unique in three respects: (1) the topics discussed all contribute to the development of a single theme -- the structure of solids; by restricting the breadth of coverage it is possible to achieve significant depth at a pace which is realistic for students without strong backgrounds in science and mathematics; (2) the style of treatment involves observation of physical phenomena, hypothesizing on models appropriate for understanding experimental results, and logical analysis to determine the adequacy of the models in the light of additional experiments. This direct experience in employing the experimental method contributes to an appreciation of the power of science and helps to develop the student's confidence in his own ability to ask and answer scientific questions intelligently; (3) the subject matter selected and the style of treatment lend themselves to a truly integrated physical science course. The sense of unity and purpose in the approach is more pervasive than are the remnants of the conventional viewpoints of specific disciplines.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, Laboratory investigations, Demonstrations.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: The subjects treated are a blend of topics from chemistry and physics. The course is designed for college freshmen; older college students may also profit. Students of all ability levels may benefit provided they have not previously studied science intensively.

K. MATERIALS PRODUCED:
1. Mainstem text entitled An Approach to Physical Science (also serves as laboratory manual).
2. Teachers' Resource Book.
3. A volume containing five supplementary chapters (to be published late spring, 1970).
4. Apparatus for performing experiments described in text and supplementary chapters.

L. MATERIALS AVAILABLE FREE: Prospective teachers may request single copies of 1, 2, and 3 from John Wiley and Sons, Inc., 605 Third Avenue, New York, N.Y. 10016.

M. MATERIALS PURCHASABLE: All materials can be ordered through John Wiley and Sons. Order forms and price lists for all items can be obtained from Wiley.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Japanese and Spanish.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 150.
2. Number of students involved: 16,000.
3. Number of schools involved: 150.
4. Total number of teachers using any of the materials: The course is a unit and portions of the materials would probably

not be used in isolation from the remainder.

5. Are the totals stated in 1, 2 and 3 estimated or definitive? These estimates are based on orders of materials and sales of texts.

6. Name and location of selected schools where the course is being taught: State University of New York at Stony Brook, Stony Brook, N.Y.; Earlham College, Richmond, Indiana; Chabot College, Hayward, California.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Questions concerning the course will be answered by A.A. Strassenburg (address in C above).

2. Activities conducted for pre-service and in-service teacher training: Summer institutes supported by NSF available for some prospective teachers; one will be offered at Earlham College in 1970. Workshops of one or two days length supported jointly by NSF and Wiley and conducted by project staff can be arranged; contact Dr. E.A. Wood, 37 Pine Court, New Providence, New Jersey 07974.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: All the materials listed in K are useful for teacher preparation. The apparatus, in particular, is essential.

S. PROJECT EVALUATION: Evaluation is in progress; the study is being conducted by Wayne Welch, University of Minnesota.

T. PROJECT PUBLICITY:

1. E.A. Wood, "PSNS Project at RPI", American Journal of Physics, 34, 891, 1966.

2. PSNS Staff, "Physical Science for Nonscientists", Physics Today, March 1967.

3. E.A. Wood, "Physical Science for Nonscience Students", American Journal of Physics, 36, 81, 1968.

4. E.A. Wood, "Physical Science for Nonscience Students", Commission on College Physics Newsletter No. 17, October 1968.

5. E.A. Wood, "The PSNS Project", Journal of Chemistry Education, 46, 69, 1969.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: The final versions of the text and Teachers' Resource Book were completed. A volume of supplementary chapters was prepared. An evaluation study was planned and initiated. A program of workshops was initiated.

V. PLANS FOR THE FUTURE: The project grant and all supported activities will terminate September 1970.

A. PROJECT TITLE: THE PORTLAND PROJECT.

B. PROJECT DIRECTOR: Karl Dittmer (Director), Dean, Division of Science, Portland State University, P.O. Box 751, Portland, Oregon 97207. Michael Fiasca (Co-Director), General Science Department, Portland State University, P.O. Box 751, Portland, Oregon 97207.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. Michael Fiasca, Co-Director.
2. Special facilities or activities available for visitor viewing: Twelve pilot schools utilizing Portland Project materials.

D. PRINCIPAL PROFESSIONAL STAFF: Not answered.

E. PROJECT SUPPORT:
1. Organizational agencies: Beaverton Oregon School District; Milwaukie, Oregon School District; Portland State University; Portland, Oregon School District.
2. Funding agencies: National Science Foundation; Portland State University.

F. PROJECT HISTORY:
1. Principal originators: Vernon Cheldelin, Michael Fiasca, Arthur Scott.
2. Date and place of Initiation: 1963; Portland, Oregon.
3. Overall project purpose: To develop interdisciplinary science courses for secondary schools.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Not answered.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Biology, chemistry and physics for students who normally elect these courses at the secondary school level.

K. MATERIALS PRODUCED:
Year I:
1. Perception & Quantification: Student Guide and Teacher Guide.
2. Heat, Energy and Order: Student Guide and Teacher Guide.
3. Mice and Men: Student Guide and Teacher Guide.
Year II:
4. Motion and Energy-Chemical Reactions: Student Guide and Teacher Guide.

5. Waves and Particles-The Orbital Atom: Student Guide and Teacher Guide.
6. Chemistry of Living Matter-Energy Capture and Growth: Student Guide and Teacher Guide.
7. Excerpts From a Teacher's Guide of Biology, Chemistry, Physics - A Three Year Sequence.

L. MATERIALS AVAILABLE FREE: Item No. 7, from Co-director.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 32.
2. Number of students involved: 2,100.
3. Number of schools involved: 12.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Definitive.
5. Name and location of selected schools where the course is being taught: Aloha High School, Aloha, Oregon; Central Catholic High School, Portland, Oregon; Cleveland High School, Portland, Oregon.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Not answered.
2. Activities conducted for pre-service and in-service teacher training: Periodic meeting of pilot teachers who are active in teaching the Portland Project course of study.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished research:
   (a) Tests designed to measure achievement in subject matter.
   (b) Pre test-semantic differential administered to all students. Post test will be administered at the end of the 1970 academic year.
   (c) Informal opinionnaire administered to students.
4. Additional evaluative data available to interested individuals: Not yet compiled for distribution.

T. PROJECT PUBLICITY:

1. Michael A. Fiasca and David Porter, "Portland Tries Integrated Course", The Science Teacher, February 1964.
2. Michael A. Fiasca and Vernon Cheldelin, " A Synthesis of the New Curricula in Physics and Chemistry for the Secondary School", Journal of Research in Science Teaching, February 1965.
3. Michael Fiasca, "Unity of Science and Inquiry Method Stressed", Science Education News, July 1965.
4. "The Portland Project", Science Education News, November 1966.
5. "An Integrated Biology, Chemistry, Physics Course", Science Education News, March 1969.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Writing teams have completed trial material for the second and third year of the integrated sequence.

V. PLANS FOR THE FUTURE:
Writing conference scheduled for final revisions of three-year sequence. Publisher will be identified and distribution of materials made to interested persons and schools.

A. PROJECT TITLE: PROCESS CURRICULUM INSTALLATION: INSTALLATION AND IMPLEMENTATION OF SCIENCE--A PROCESS APPROACH.

B. PROJECT DIRECTOR: Dr. James Mahan, Director, Process Curriculum Installation Component, Eastern Regional Institute for Education (ERIE), 635 James Street, Syracuse, New York 13203. (315)474-5321.

C. PROJECT HEADQUARTERS:

1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: 55 cooperating schools in New York and Pennsylvania which serve as demonstration sites; ERIE will provide the names and addresses of these sites you request; arrangements for visitations should be made directly with school principals.

D. PRINCIPAL PROFESSIONAL STAFF: ERIE Staff Associates: Fred Brown, Harold Harty, Charles Wallace, William Ritz, Roger Ming.

E. PROJECT SUPPORT:

1. Organizational agency: ERIE - A Title IV laboratory organized through the U.S. Office of Education.
2. Funding agencies: U.S. Office of Education; National Science Foundation; New York State Department of Education; Pennsylvania Department of Education.

F. PROJECT HISTORY:

1. Principal originators: N. Sidney Archer, Richard Ford, James Mahan.
2. Date and place of Initiation: Spring, 1967; ERIE, Syracuse, New York.
3. Overall project purpose: To promote the installation and refinement of process-promoting science materials in the elementary school.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:

1. To install process-oriented science curricula in grades K-6 of elementary schools of diverse characteristics - current concentration upon installation of Science--A Process Approach.
2. To develop a variety of strategies for the installation of process-oriented science curricula in elementary schools of diverse characteristics.
3. To activate other agencies and educators to demonstrate, install, and/or support the installation of process-oriented science curricula in grades K-6 in elementary schools.
4. To produce a series of articles, brochures, evaluative reports, technical papers, conferences, audio-visual products, etc., that will assist others to install process-oriented science curricula. The uniqueness of the Process Curriculum Installation lies not so much with the development of new

process-oriented science curricula but rather with the effort to facilitate the successful installation of existing process science materials into the elementary classroom. The quantity and quality of the curriculum installation is to be monitored in each school for a minimum of four years.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Not applicable.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Materials are designed for elementary school teachers, administrators, and university personnel working with pre- and inservice elementary teachers and others interested in process promoting elementary curricula.

K. MATERIALS PRODUCED:

1. Report on the Analysis of Some Process-Oriented Curricula: An Annotated Listing, Program Report 101.
2. Installing a New Curriculum: Observations and Recommendations, Program Report 102.
3. The Role of a Teacher-Leader in Curriculum Installation. Wallace, Charles W; Buddle, Ann C; Mahan, James M., Program Report 104.
4. The Regional Action Network: Involving the Professor in Curriculum Innovation by James M. Mahan, Program Report 105.
5. University Professors View the Installation of "Science--A Process Approach" by Mohan, Charles M., and Mahan, James M., Program Report 106.
6. How to Plan a Curriculum Demonstration Day by James M. Mahan, Program Report 107.
7. How to Conduct a Workshop by Ritz, William C. and Wallace, Charles W.
8. Instructional Guide for a Science--A Process Approach Workshop by ERIE science staff.
9. An Analysis of the Questions Asked and Requests Made of External Science Consultants by Elementary School Teachers by James M. Mahan.
10. Inferring the Characteristics of Packaged Articles. 16mm black and white film developed to illustrate portions of a Science--A Process Approach exercise.

L. MATERIALS AVAILABLE FREE: 1-9 listed in item K available in limited quantity from ERIE, 635 James Street, Syracuse, New York 13203; item 10 available on limited loan from ERIE.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. A Research Report(s) on variables affecting curriculum installation.

2. A set of audio tapes designed to assist teachers with installation of Science--A Process Approach.

3. A series of data-based generalizations on the process of curriculum installation.

4. Process reports indicate the amount of Science--A Process Approach activities taught by teachers from year to year.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 580.

2. Number of students involved: 19,500.

3. Number of schools involved: 55 elementary schools in New York and Pennsylvania.

4. Total number of teachers using any of the materials: 600.

5. Total number of students using any of the materials: Not applicable.

6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Definite totals.

7. Name and location of selected schools where the course is being taught: Cortland Campus, Cortland, New York; Nathaniel Rochester No. 3, Rochester, New York; Rosedale Elementary, White Plains, New York; Ticonderoga Elementary Middle, Ticonderoga, New York; Westmere Elementary, Albany, New York; Porter Elementary, Syracuse, New York; Gardiners Avenue, Levittown, New York; Croton Elementary, Croton, New York; John Kennedy, Batavia, New York; Onondaga Hill, Syracuse, New York; Paulding Elementary, Tarrytown, New York; Sherman Elementary, Watertown, New York; Watkins Glen Elementary, Watkins Glen, New York; J. Henry Cochran Elementary, Williamsport, Penna.; Fairview Elementary, Fairview, Penna.; Shannock Valley Elementary, Rural Valley, Penna.; Boalsburg Elementary, State College, Penna.; Brighton Township Elem., Carlisle, Penna.; Roosevelt Elementary, Media, Penna.; Dr. Edward Tracy Elementary, Easton, Penna.; White Oak Elementary, McKeesport, Penna.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: An integral part of the Process Curriculum Installation Program is found in the training and utilization of consultants. Each of the 55 schools in the project is served by a consultant on a minimum time commitment of 12 full school days per academic year. Items 7 and 8, letter K, were partially developed for and utilized in workshops subsidized by the National Science Foundation for the purpose of training college professors as consultants for the curriculum, Science--A Process Approach. Items 6 and 7, letter K, are products resulting from the use of college professors as consultants. Thirty-seven college professor-consultants are currently

working in the 55 ERIE associated schools. ERIE also uses 5 staff associates as consultants in the associated schools.

2. Activities conducted for pre-service and in-service teacher training: In addition to workshops conducted to train college professors as consultants financed by the National Science Foundation, ERIE, in cooperation and with part financial support of the State Education Departments of New York and Pennsylvania has, since the summer of 1967 conducted a series of workshops to train inservice teachers in working with Science--A Process Approach. These workshops are open to teachers from any state on a tuition basis.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Letter K, items 6-10, have been developed for utilization by science educators to assist in pre-service and in-service teacher training in elementary science.

S. PROJECT EVALUATION:

1. Has the effectiveness of the installation procedures been evaluated? Yes, by project staff and by (USOE sponsored) site visitation teams of professors and other educators and New York and Pennsylvania State Education Departments.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research:
    (a) "A Comparison of ERIE Science--A Process Approach Teacher Workshops of 1968 and 1969: Perceptions of the Participants" by William C. Ritz.
    (b) "Workshop Evaluation by Means of the AAAS Science--A Process Approach Measure for Teachers" by William C. Ritz.
    (c) "Report on Written Installation Questionnaire administered to Science--A Process Approach teachers in 21 ERIE pilot schools May and June, 1969" by Charles W. Wallace.
    (d) "Report on Oral Installation Interview administered to Science--A Process Approach teachers in 21 ERIE pilot schools May and June, 1969" by Charles W. Wallace.
    (e) "Report on Pupil Achievement on Science--A Process Approach Competency Measures and Teacher Attitude Toward Exercises in 21 ERIE Pilot Schools, 1968-69" by Charles W. Wallace.
    (f) "Statistical Report - Consultants Perception of Variables That Can Hinder the Success of Science--A Process Approach Installation" by Harold Harty.
    (g) "Statistical Report and Observations on Attitudes Toward Science--A Process Approach Installation" from 4th and 5th grade teachers in ERIE pilot schools prior to an initial workshop session by Harold Harty.
    (h) "Influence of Diverse Factors upon the Installation of a Process-Oriented Curricula of Science in Elementary Schools of Diverse Characteristics" - Richard S. Andrulis and Charles Wallace.

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(i) "Analysis of Science--A Process Approach competency measure scores from ERIE pilot schools" - Betty J. McKnight.

(j) "Classroom Teachers Look at Science--A Process Approach" by Betty J. McKnight.

(k) "How Effectively Do Teachers Utilize Consultants?; An Analysis of Teacher Questions and Requests", James M. Mahan.

(l) "A Regional Approach to Improving Elementary School Science", by William C. Ritz.

4. Additional evaluative data available to interested individuals: Limited copies of most unpublished research reports are available from ERIE on request.

T. PROJECT PUBLICITY:

1. James M. Mahan and Betty Lou Confair, "ERIE's Regional Action Network: Can It Help Solve Your Science Curriculum Problems?", The Reporter, (Central New York School Study Council, Syracuse University).

2. James M. Mahan, "The Teacher's View of the Principal's Role in Innovation", The Elementary School Journal, April 1970.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Only product mentioned in 1968 Clearinghouse Report is listed in letter K as Report 102. All additional products represent new activities since that time.

V. PLANS FOR THE FUTURE: Further identification of variables influencing the successful installation of Science--A Process Approach in diverse schools. Audio tapes, video tapes, and films displaying exemplary, inquiry-oriented teacher behaviors are scheduled for future production.

A. PROJECT TITLE: PROJECT IN-STEP (IN-SERVICE TEACHER EDUCATION PROGRAM).

B. PROJECT DIRECTOR: John C. Thurber, Director, Project IN-STEP, I. T. V. Center, 505 South Congress Avenue, Boynton Beach, Florida 33435. (305)683-0050, Ext. 370, 371.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Previewing of project-produced video tapes or kinescopes.

D. PRINCIPAL PROFESSIONAL STAFF: John C. Thurber, Director; Karl L. Combs, Instructor; Allen Carnahan, Instructor; Alice Williamson, Secretary; Robert Evans, Program Statistician.

E. PROJECT SUPPORT:
1. Organizational agencies: Not answered.
2. Funding agencies: U. S. Office of Education - Title III ESEA (P. L. 89-10)

F. PROJECT HISTORY:
1. Principal originators: Dr. Rodney A. Lane, Dr. Herold M. Harmes, Robert Binger, Robert Westbrook, John C. Thurber.
2. Date and place of Initiation: July 1, 1968; Palm Beach County, Florida.
3. Overall project purpose: Development of an individualized multi-media approach to in-service teacher education. The model was developed using AAAS Science - A Process Approach materials.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: The IN-STEP model for in-service training was developed using AAAS Science - A Process Approach as the vehicle. The complete program package is now available for this course. A program for instruction of basic teaching strategies reflecting contemporary trends is under development. In the IN-STEP method teachers are pre-tested then dependent upon diagnosis of the test results placed in one of the 4 instructional groups which are then subjected to various individual and group instructional procedures. Participants, depending upon their entry skills, are involved in the many faceted approach made possible by the various media. In much of the program the learner proceeds at his own rate.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Video tapes and/or kinescope copies, Discussion groups, Action handbook, Small classes.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science - A Process Approach (AAAS Science) In-Service Instruction for Teachers.

K. MATERIALS PRODUCED:

Video tape series (tape length - 25 minutes)

1. Introduction to IN-STEP.
2. Philosophy and Mechanics of Science - A Process Approach.
3. Behavioral Objectives I.
4. Behavioral Objectives II.
5. Implementation I.
6. Implementation II.
7. Observing I - (Process Rationale).
8. Observing II - (Sample Lesson).
9. Classifying I - (Process Rationale).
10. Classifying II - (Sample Lesson).
11. Using Space/Time Relationships I - (Process Rationale).
12. Using Space/Time Relationships II - (Sample Lesson).
13. Communicating I - (Process Rationale).
14. Communicating II - (Sample Lesson).
15. Measuring I - (Process Rationale).
16. Measuring II - (Sample Lesson).
17. Inferring I - (Process Rationale).
18. Inferring II - (Sample Lesson).
19. Predicting I - (Process Rationale).
20. Predicting II - (Sample Lesson).
21. Formulating Hypotheses I - (Process Rationale).
22. Formulating Hypotheses II - (Sample Lesson).
23. Controlling Variables I - (Process Rationale).
24. Controlling Variables II - (Sample Lesson).
25. Interpreting Data I - (Process Rationale).
26. Interpreting Data II - (Sample Lesson).
27. Defining Operationally - (Process Rationale and Lesson).
28. Using Numbers - (Process Rationale and Lesson).
29. Experimenting I - (Process Rationale).
30. Experimenting II - (Sample Lesson).

Other Items:

31. Kinescope copies of the video tape series.
32. Action Handbook - correlated with video tape series - involves participants in psychomotor activities; before, after and sometimes during viewing of tape series in order to aid in development of cognitive skills.
33. Self-study Programmed Text - includes material on: philosophy of contemporary science education in the elementary schools emphasizing AAAS, the format of AAAS material, behavioral objectives, and each of the basic and integrated processes.
34. Elementary Science Teachers Inventory (pre and post test).
35. Teacher Attitude Survey Questionnaire.
36. Student Tests of Process Acquisition
    a. Observation.
    b. Measurement.

37. Q-Sort student attitude survey on I. B. M. cards for easy scoring.
38. Footprints from IN-STEP (news letter).
39. Evaluation Report - Phase I.

L. MATERIALS AVAILABLE FREE: Items 32 - 39; From: Project Headquarters.

M. MATERIALS PURCHASABLE: Items 1 - 31. At cost with slight charge for service. Approximately $1,400 for video tapes and $1,100 for kinescopes; however, a set of 2" tapes is available on loan at no charge to systems desiring to duplicate tapes at their expense.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Possibility of Spanish (not definite at this time).

P. ADDITIONAL MATERIALS BEING DEVELOPED: A complete new set of materials on teaching strategies - including basic information on behavioral objectives, conceptual behavioral hierarchies, individualized instruction techniques, needs assessment techniques, instructional systems and exemplary programs.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 875.
2. Number of students involved: Approximately 24,500.
3. Number of schools involved: 90.
4. Total number of teachers using any of the materials: 875.
5. Total number of students using any of the materials: Not applicable.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? 1, 3, 4 definitive, 2 estimated.
7. Name and location of selected schools where the course is being taught: Palm Beach County, Florida; Alachua County, Florida.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Project staff is available for consultant services.
2. Activities conducted for pre-service and in-service teacher training: Workshops for AAAS Science, Implementation of AAAS, Utilization of AAAS materials, Behavioral Objectives, In-Service training in Modern Staff Development Programs; costs depend upon nature of workshop and number of staff involved.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: All materials available. See items L and M for cost.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies: IN-STEP Evaluation Report - Phase I.

3. Brief abstract of in-house or unpublished research: The project has successfully developed an efficient, economical model for inservice training of teachers. The model was developed using AAAS Science but is applicable to other areas.

4. Additional evaluative data available to interested individuals: From project director.

T. PROJECT PUBLICITY: Not answered.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: See item P.

A. PROJECT TITLE: PROJECT LOCAL (LABORATORY PROGRAM FOR COMPUTER-ASSISTED LEARNING).

B. PROJECT DIRECTOR: Robert N. Haven, Project Director, 44 School Street, Westwood, Mass. 02090. (617)326-3050.

C. PROJECT HEADQUARTERS:

1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Computer-assisted instruction installations in five school systems; secondary level students using computer as problem-solving vehicle; computer-administered drill exercises in math and science; classroom demonstration of math concepts using computer; inservice training courses for teachers.

D. PRINCIPAL PROFESSIONAL STAFF: Robert D. Slagle, Assistant Director. School System Coordinators: James E. Pender, Westwood; Walter Koetke, Lexington; Francis Collins, Natick; Karl West, Needham; Henning Sahlberg, Wellesley.

E. PROJECT SUPPORT:

1. Sponsor and Fiscal Agent: Town of Westwood, Mass.
2. Funding agencies: U.S. Office of Education, Title III ESEA; Massachusetts towns of Lexington, Natick, Needham, Wellesley and Westwood.

F. PROJECT HISTORY:

1. Principal originator: James E. Pender, Director of Mathematics, Westwood Public Schools.
2. Date and place of Initiation: July 1, 1967; Westwood, Massachusetts.
3. Overall project purpose: Improve math, science and social science instruction through use of computer as a teaching aid.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES:

1. Integration of the computer into the regular math and science curricula - use of the computer as a teaching aid for: (a) problem-solving (b) class demonstration, and (c) computer-based drill and practice.
2. Development of a computerized clerical support system for individualized instruction.
3. Integrating instruction about the social implications of the computer into the regular social studies curriculum.
4. Organizing and sponsoring computer clubs to provide an outlet for students with special interests and to teach computer concepts not normally taught in a math or science class.
5. Setting up and maintaining a participating membership program to provide computer services to other school systems.
6. Conducting pilot programs with appropriate experimental structuring in order to further evaluate the usefulness of the computer as a teaching aid.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Lectures, Computer assisted instruction.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: All mathematics, grades 7-12, average and above average; high school chemistry and physics; high school social studies-science courses.

K. MATERIALS PRODUCED:

1. "Project LOCAL" - 4 page descriptive article giving many details.
2. Computers in the Classroom - Teacher's resource manual for algebra: teaching strategies, computer programs (130 pp.)
3. Resource Materials for Computer-Assisted Science Teaching teaching strategies, computer programs (226 pp.)
4. A Guide to Teaching Computer Programming in the FOCAL Language (145 pp.)
5. Problem-Solving with FOCAL - Part I - Programmed Text (70 pp.)

L. MATERIALS AVAILABLE FREE: Item 1, available from project office.

M. MATERIALS PURCHASABLE: Item 2, $1.00; Item 3, $12.50 (Xerox Copy); Item 4, $8.00 (Xerox Copy). Available from project office.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Problem Solving with FOCAL - Part II (programmed text). Computer programs to provide clerical support for individualized instruction.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Approximately 60.
2. Number of students involved: About 2400.
3. Number of schools involved: About 30.
4. Total number of teachers using any of the materials: Unknown.
5. Total number of students using any of the materials: Unknown.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated on basis of recent cursory surveys.
7. Name and location of selected schools where the course is being taught: Lexington High School, Lexington, Mass.; Natick High School, Natick, Mass.; Needham High School, Needham, Mass.; Wellesley Junior High, Wellesley, Mass.; Westwood High School, Westwood, Mass.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Computer programming assistance.

2. Activities conducted for pre-service and in-service teacher training: One in-service training course for teachers each school semester; subjects are computer programming and how to integrate use of computer into existing curricula. Financed jointly by Title III ESEA and local school systems.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Items 2, 3, and 4 in K above.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies:
Project LOCAL I End of Budget Period Report (12/68)
Project LOCAL II End of Budget Period Report (to be available 4/70)

3. Brief abstract of in-house or unpublished research: None.

4. Additional evaluative data available to interested individuals: Report (1) indicated above available from project office in Xerox form for $6.00 per copy. Available from ERIC.

T. PROJECT PUBLICITY:

1. Robert D. Slagle, "Computer-Assisted Learning Taught in Project LOCAL" - The Science Teacher, January 1969, Vol. 36, No. 1.

2. Robert D. Slagle, "Project LOCAL" - Journal of Data Education, Vol. X, No. 2, November 1969.

3. Computers and Automation, 3/70 (name not available)

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

1. 5-year expansion program under local community funding will commence in 1971.

2. Computer-managed instruction system under development; planned availability for late 1970.

3. Increasing emphasis on computer based drill and tutorial operations beginning in 1972.

A. PROJECT TITLE: QUANTITATIVE APPROACH TO ELEMENTARY SCHOOL SCIENCE (QS).

B. PROJECT DIRECTOR: Clifford E. Swartz, Professor of Physics, Physics Department, State University of New York, Stony Brook, New York 11790. (516)246-6592.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Original staff disbanded - original project completed. Published materials now being tried in schools.

E. PROJECT SUPPORT:
1. Organizational agency: Research Corporation, SUNY.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Clifford Swartz, Ben Werner.
2. Date and place of Initiation: June 1964; Stony Brook, New York.
3. Overall project purpose: Devise and demonstrate quantitative methods for elementary school science.

G. PRESENT COMMERCIAL AFFILIATIONS: Scott, Foresman and Co.

H. PROJECT OBJECTIVES:
1. Prepare materials for science instruction that can be taught by teachers without special science training.
2. Combine math and science, making most lessons quantitative.
3. Treat only phenomena and concepts which can be seen or manipulated by the child.
4. Define specific testable goals.
5. Design lessons so that apparatus is inexpensive and set-up time is small.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Grades 3-6, Also remedial for 7 and 8.

K. MATERIALS PRODUCED:
(1a) Book I and (1b) Teacher's Guide - (1c) Lab kit I (3rd or 4th grade)
(2a) Book II and (2b) Teacher's Guide - (2c) Lab kit II (4th or 5th grade)
(3a) Book III and (3b) Teacher's Guide - (3c) Lab kit III (5th, 6th, 7th grade). Books I-III are consumable student books.

L. MATERIALS AVAILABLE FREE: Brochure: Scott, Foresman & Co., 1900 E. Lake Avenue, Glenview, Illinois 60025.
Statement of Guidelines: Clifford Swartz, Physics Dept., SUNY Stony Brook, New York 11790.

M. MATERIALS PURCHASABLE: Scott, Foresman & Co., 1900 E. Lake Avenue, Glenview, Illinois 60025.

(1a)	$ .90	(2a)	$ 1.20	(3a)	$ 1.20
(1b)	.75	(2b)	.75	(3b)	.75
(1c)	57.00	(2c)	84.00	(3c)	117.00

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Similar materials for non-readers in kindergarten and 1st grade.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: About 1000 during 1969.
2. Number of students involved: About 25,000.
3. Number of schools involved: About 500.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated from sales.
5. Name and location of selected schools where the course is being taught: Not answered.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Workshops at NSTA meetings.
2. Activities conducted for pre-service and in-service teacher training: NSF sponsored Cooperative College-School Science program.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Trial teaching kit available from Scott, Foresman.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: "Elementary School Science by a Quantitative Approach", Journal of Research in Science Teaching, 2:349, (1964).
3. Brief abstract of in-house or unpublished research: First complete trial of present material now being conducted during 1969-70.
4. Additional evaluative data available to interested individuals: Not yet.

T. PROJECT PUBLICITY:
   1. Journal of Research in Science Teaching, 2:349, (1964).
   2. The Grade Teacher, January 1968.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Materials were made available from Scott, Foresman. These materials are being tested in schools near the University at Stony Brook.

V. PLANS FOR THE FUTURE: Not answered.

A. PROJECT TITLE: QUANTITATIVE PHYSICAL SCIENCE (QPS).

B. PROJECT DIRECTOR: Dr. Sherwood Githens, Jr., Professor of Science Education, Duke University, College Station, Durham, N.C. 27708. (919)684-3924.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: A classroom and stock room, complete with the QPS teaching equipment, to show to visitors.

D. PRINCIPAL PROFESSIONAL STAFF: Sherwood Githens, Director; Bernard D. Toan, Secondary Curriculum Supervisor, Durham City Schools.

E. PROJECT SUPPORT:
1. Organizational agency: Duke University.
2. Funding agency: At the moment, none, other than the University.

F. PROJECT HISTORY:
1. Principal originator: Sherwood Githens.
2. Date and place of Initiation: January, 1963; Duke University and Durham Schools.
3. Overall project purpose: To develop and implement an equipment-based, junior-high course in physical science.

C. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: This course was designed for the age-14 student primarily. However, it is being used, for various purposes, in all the grades from 7 through 12. One of the original objectives was to prepare the student so that he can extract more benefit from the science and mathematics courses he may take in senior high school. It was also to serve as a terminal course, with general education qualities. It provides the machinery with which to attain a number of behavioral objectives that could lead toward a career in science or engineering. Learning starts with specifics and progresses to generalities and conclusions, with processes and scientific content intermingled. A textbook supplies connecting links, organizes that which has been observed in the classroom, and serves as a basis for study and review. Teacher demonstrations are usually in connection with a device the students are about to use.

Generally, three or four manipulative learning operations form the basis for each unit of instruction. The work is sequenced so that the course content preceding any unit constitutes preparation for that unit.

In one respect the aim is to provide an instructional program in the basic elements of scientific communication - the elements that will aid a person in understanding what is presented to him in textbooks, technical articles, and lectures. The basics include: scientific notation, metric measurement units, slide rule work and related calculation processes, symbolism, graphical analysis, the making of approximations, and rapid and accurate scale reading. These objectives are stated in the QPS general information brochure.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, Laboratory investigations, Various types of exercises.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Physical science; nominally grade 9, age 14 and older.

K. MATERIALS PRODUCED:
1. QPS Teacher's Manual, Vol. 1, covering Units 1-16, 1969.
2. QPS Teacher's Manual, Vol. 2, covering Units 17-25 - (available summer 1970).
3. QPS Textbook, 1968.
4. QPS Student's Manual, Vol. 1, 1970.
5. Worksheet package.
6. General information brochure.

(Items 1-5 are extended experimental editions)

L. MATERIALS AVAILABLE FREE: Item 6, from: QPS Project, College Station, Durham, N.C. 27708.

M. MATERIALS PURCHASABLE: From: QPS Project, College Station, Durham, N.C. 27708.

Item No.	Single Copy	In classroom lots
1	$ 7.50	$ --
2	7.50	--
3	4.40	2.20
4	4.00	2.00
5	1.00	.75

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Some of the equipment items used by the students have been re-designed for greater pedagogical effectiveness or reduction in cost.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 88.
2. Number of students involved: 10,000 this year.
3. Number of schools involved: 56.

4. Total number of teachers using any of the materials: Others are using parts.
5. Total number of students using any of the materials: Unknown.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Definitive for 1, 2 and 3.
7. Name and location of selected schools where the course is being taught: See list of original schools in front of textbook or contact director.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: None; teachers are expected to be able to teach the course by use of the Teacher's Manual.
2. Activities conducted for pre-service and in-service teacher training: None are conducted. Hopefully none are needed.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: The Teacher's Manual and the other printed materials should suffice if the science educator should desire to give specific orientation on QPS teaching. We also have a 2x2 slide show that illustrates the equipment setups for many of the classroom manipulative learning operations (MLOs).

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: The QPS materials themselves represent the research end-results. Our Newsletter No. 13 reports on pre- and post-achievement tests conducted in school year 1967-68, with 4,100 QPS and 1,460 non-QPS students.
3. Brief abstract of in-house or unpublished research: A dissertation has been completed reporting that under certain specified conditions, self-paced operation of the QPS course can be done successfully with measurably greater student achievement than under group instruction. A research study is now in progress in a senior high school comparing the records of students who took QPS in 9th grade with those who didn't, and analyzing a number of associated questions.
4. Additional evaluative data available to interested individuals: None as yet.

T. PROJECT PUBLICITY:
Journal of Research in Science Teaching, Vol, 2, pp. 345-348 (1964).
Other articles are in preparation.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: At a modest pace, the written materials are being re-worked and polished. Because the equipment used by the students is the major feature of the course, we have been seeking to interest a large firm in taking over that part of the project.

V. PLANS FOR THE FUTURE:

The project is about ready for phase-out, and will be terminated when a satisfactory arrangement has been made for a commercial organization to take over that which we have produced. We hope that there will be an "Installation Manual" which advises school officials on how to install this type of equipment-based instruction with greatest effectiveness at the least cost.

A. PROJECT TITLE: SCHOOL HEALTH EDUCATION STUDY, INC. (SHES).

B. PROJECT DIRECTOR: Elena M. Sliepcevich, Director, School Health Education Study, 1507 M Street, N.W., Washington, D.C. 20005 (202)223-9400, Ext. 607.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Office where all printed publications, transparencies, and other visual materials are available for viewing by appointment.

D. PRINCIPAL PROFESSIONAL STAFF: Elena M. Sliepcevich, Director; Ann E. Nolte, Associate Director; Peter Cortese, Research Associate; Colston R. Stewart, Jr., Curriculum Assistant.

E. PROJECT SUPPORT:
1. Organizational agency: SHES is a non-profit, tax-exempt, interdisciplinary research, curriculum and educational project.
2. Funding agencies: From September 1961 to December 1965, the SHES project was funded by the Bronfman Foundation of New York City. From 1966 - to current: 3M Company, Visual Products Division.

F. PROJECT HISTORY:
1. Principal originators: Herman E. Hilleboe, M.D.; Granville W. Larimore, M.D. At the time of project initiation, these persons served as Commissioner and Deputy Commissioner respectively of the New York State Department of Health.
2. Date and place of Initiation: September 15, 1961; Washington, D.C.
3. Overall project purpose: To upgrade the quality and quantity of health education program from grades K through twelve.

G. PRESENT COMMERCIAL AFFILIATIONS: 3M Company, Education Press, 3M Center, St. Paul, Minnesota 55101.

H. PROJECT OBJECTIVES:
1. Before launching into a curriculum development project, a monograph of research in fourteen selected areas of health instruction over a 30 year period was published. This provided a baseline as to what had been done. (Reference No. 1 in K).
2. A nationwide study of 135 randomly selected large, medium and small school districts was conducted to determine the status of health instructional practices and the problems; in these same schools over 17,000 students in grades 6, 9, and 12 were administered Health Behavior Inventories to

determine weaknesses and strengths and to determine health misconceptions. (Reference No. 2 in K)

3. The curriculum phase of the project extends from grades K through 12 and is based on a conceptual approach to health education which was accepted as the most feasible approach after a tryout period in four major school districts. (Reference No. 3 in K)

4. Teaching-Learning Guides and accompanying extensive resource compilation, and visual transparency packets based on the behavioral objectives have been developed for each of ten concepts. The materials are all designed for four progression levels for grades K through 12, and are flexible and adaptable to varying community situations.

The materials are multi-ethnic. They focus on man, knowledge, attitudes, feelings and actions, and his total health in all dimensions - physical, mental and social.
The ten concepts are all interrelated and evolve from three key concepts: Growing and Developing, Interacting, and Decision Making. The Learning Opportunities are student and process oriented and designed to bring a closer relationship involving the individual, family and community. (Reference No. 4 in K)

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups, Some 75 different types of learning opportunities which are community and student centered and involve extensive student participation.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Health Education.

K. MATERIALS PRODUCED:

1. Synthesis of Research in Selected Areas of Health Instruction, 1963 (3 printings).
2. School Health Education Study: A Summary Report, 1964 (3 printings).
3. Health Education: A Conceptual Approach to Curriculum Design for grades K-12, 1967 (3 printings).
4. Teaching Learning Guides, accompanying Resource Compilation and approximately twenty visual transparency packets based on behavioral objectives for each concept:

   Concept No. 6: "The family serves to perpetuate man and to fulfill certain health needs" 1967.
   Concept No. 8: "Utilization of health information, products, and services is guided by values and perceptions" 1967.
   Concept No. 1: "Growth and development influences and is influenced by the structure and functioning of the individual" 1968.

Concept No. 9: "Use of substances that modify mood and behavior arises from a variety of motivations", September 1968.
Concept No. 5: "There are reciprocal relationships involving man, disease, and environment" May 1969.
Concept No. 3: "Protection and promotion of health is an individual, community, and international responsibility." March 1970.

Concepts 4, 2, 10, and 7 to be published during late 1970 and 1971.

5. Human Potential in a Dynamic Environment - Report of a Writing and Working Conference, Airlie House, Virginia, June 9-11, 1968.
6. Institutions Offering Programs of Specialization in Health Education for Schools, Colleges, Communities at the Undergraduate and Graduate Levels, December 1967 (out of print) and January 1970.
7. A variety of bibliographies, reprints, flyers, brochures, and other descriptive materials which are developed to answer inquiries.
8. A scope and sequence chart listing the 10 concepts, and the behavioral objectives sequenced at 4 progressive levels (K-12), 1970.

L. MATERIALS AVAILABLE FREE:
Items 2 and 5 in limited quantities; item 6 (Jan 1970 edition); items 7, 8.

M. MATERIALS PURCHASABLE:
Items 3 and 4:
All curriculum materials including Health Education: A Conceptual Approach to Curriculum Design, K-12, Teaching Learning Guides at four progression levels for the concepts, the accompanying resource compilations for each concept and visual packets based on each concepts' behavioral objectives are available for purchase from 3M Visual Products, Education Press, 3M Center, St. Paul, Minnesota 55101 in various kinds of offering depending on the needs of the purchaser. (A current catalogue should be requested from 3M).

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None currently.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
Completion of Teaching Learning Guides accompanying Resource Books and visual packets for four remaining concepts plus a Continuing Education Book for professional preparation. Other In-Service Manuals and Sound-on-Slide Visual Presentations have been developed by the publisher and are available

from 3M, the publisher of SHES materials.

Q. PROJECT IMPLEMENTATION:
Data on implementation unavailable; materials are being used in every state and overseas. Four tryout centers used the experimental materials early in 1965. These were Alhambra, California; Evanston, Illinois; Great Neck - Garden City, New York; and Tacoma, Washington.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Conferences, assistance with workshops, seminars, and institutes for schools, colleges and community groups. Countless telephone inquiries and letters are answered offering assistance on specific problems related to teacher preparation.
2. Activities conducted for pre-service and in-service teacher training: As a project the consultant activities described in the previous answer are provided. The publisher of the SHES materials (the 3M Company) has conducted five national seminars, two regional seminars, and several weekend local workshops.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: In addition to basic document and Teaching Learning Guides, a set of three In-Service visual packets (60 visuals) based on the underlying research, the curriculum approach, and implementation process are available each, with accompanying outlines; an In-Service leadership training seminar guide with 30 accompanying visuals; a film "For Each and Every Child" (1969); 2 sets of Sound-on-Slide series, (all prices available from the publisher).

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes. The experimental materials were evaluated for their effectiveness rather than in terms of student progress. The final materials currently are being used and evaluated in several states and local areas by both internal and outside groups in terms of student achievement.
2. Pertinent published research studies:
(a) Sliepcevich, Elena M. School Health Education Study: A Summary Report, Washington, D.C., School Health Education Study, 1964.
(b) Creswell, William H., Jr., J. Thomas Hastings, and Warren J. Huffman, "Results of Experimental Group Testing of the School Health Education Study Material," Journal of School Health, April 1966, pp. 154-164.
(c) Sliepcevich, Elena M. "School Health Education Study: Appraisal of a Conceptual Approach to Curriculum Development," Journal of School Health, April 1966, pp. 145-153.

3. Brief abstract of in-house or unpublished research: Several thesis and dissertations have been written based on the development of evaluation instruments relating to the SHES curriculum materials. Analysis of feedback from schools, teacher preparation institutions, and community groups. Several hundred comments from teachers, principals, and unsolicited student reactions to SHES materials.

4. Additional evaluative data available to interested individuals: In the process of being compiled.

T. PROJECT PUBLICITY:

1. Breen, Mary P. "A Conceptual Approach to School Health Education in the U.S.A.," The Educational Gazette, April 1969, pp. 141-143; June 1969, p. 253.
2. Breen, Mary P. "U.S.A. School Health Education, A National Status Study," The Education Gazette, March 1969, pp. 79-82.
3. Clifton, Benton. "School Health Demonstration Project," Florida Trends in Public Health, December 1968.
4. Creswell, William H., Jr. "Implications from the School Health Education Study," Illinois Journal of Education, April 1966, pp. 24-28.
5. Fossett, Barbara. "Health Education in the Elementary School: A Humanistic Curriculum," The National Elementary Principal, November 1968, pp. 61-64.
6. Johns, Edward B. "The Concept Approach in Health Education," Journal of School Health, May 1965, pp. 196-209.
7. Means, Richard K. "The School Health Education Study: A Pattern in Curriculum Development," Journal of School Health, January 1966, pp. 1-11.
8. Sliepcevich, Elena M. "School Health Education Study: Appraisal of a Conceptual Approach to Curriculum Development," Journal of School Health, April 1966, pp. 145-153.
9. Sliepcevich, Elena M. and Ann E. Nolte. "Curriculum In Perspective: The School Health Education Study." The National Elementary Principal, April 1968, pp. 43-47.
10. Sliepcevich, Elena M. and Ann E. Nolte. "A New Curriculum Design in Health Education: The Process and Product of a Nationwide Study," International Journal of Health Education, October-December 1967, pp. 187-195.
11. Tyler, Louise L., Associate Professor of Education, University of California, Los Angeles, Educational Leadership, May 1968, pp. 776-779.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Writing Conference, Sun Valley, Idaho, June 5-13, 1970 (held annually since 1964). Advisory Committee meets twice a year in spring and fall to plan.

A. PROJECT TITLE: SCHOOL MATHEMATICS STUDY GROUP (SMSG).

B. PROJECT DIRECTOR: Dr. E. G. Begle, SMSG - Cedar Hall, Stanford University, Stanford, California 94305. (415) 321-2300, extension 2912.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director, SMSG.
2. Special facilities or activities available for visitor viewing: There are no facilities for visitors.

D. PRINCIPAL PROFESSIONAL STAFF: Anneli Lax, Executive Editor, Monograph Project.

E. PROJECT SUPPORT:
1. Organizational agencies: Stanford University and the Conference Board of the Mathematical Sciences.
2. Funding agencies: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Ad hoc Conference of Mathematicians.
2. Date and place of Initiation: March 1958; Yale University.
3. Overall project purpose: To bring together classroom teachers and research mathematicians in a joint effort to improve the pre-college mathematics curriculum.

G. PRESENT COMMERCIAL AFFILIATIONS: The monograph series "New Mathematical Library" is published by Random House, Inc., 457 Madison Avenue, New York 22, N.Y. The filmed course for elementary school teachers is distributed by Modern Learning Aids, 3 East 54th Street, New York 22, N.Y.

H. PROJECT OBJECTIVES: The primary purpose of the SMSG is to foster research and development in the teaching of school mathematics. The work of SMSG consists primarily in the development of courses, teaching materials and teaching methods. It is a part of SMSG's task, in cooperation with other mathematical organizations, to encourage exploration of the hypotheses underlying mathematics education.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Normal classroom procedures.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics, kindergarten through grade 12; teacher training materials.

K. MATERIALS PRODUCED:
Newsletters. Information concerning SMSG is disseminated through its Newsletters which appear at irregular intervals. Names are added to the mailing list for these Newsletters

on request.
1. Organization, history and activities of SMSG.
2. Minnesota National Laboratory reports.
3. Teachers' reports on experimental units for grades 7 and 8.
4. Progress report on the work of SMSG.
5. In-service preparation of mathematics teachers.
6. Progress report on the work of SMSG and order form.
7. Publications available from Yale University Press.
8. Announcement of the New Mathematical Library Series.
9. Materials which should be ordered from SMSG.
10. Reports on student achievement in SMSG courses.
11. Future of SMSG, new projects and publications.
12. In-service education program and announcement of textbooks.
13. How texts are prepared and publications lists.
14. New Mathematical Library series in print and preparation.
15. Reports on various SMSG projects.
16. SMSG publications.
17. Lists Supplementary Publications and selected list of inexpensive books for supplementary use.
18. New SMSG publications.
19. Report of a survey of in-service programs for mathematics teachers.
20. SMSG publications.
21. Reference guide to the New Mathematical Library - Description, Topical classification and Index with suggested grade levels.
22. SMSG publications.
23. Panel on Supplementary Publications.
24. Reports of various SMSG projects.
25. Articulation of Content of SMSG Tests, grades 7-10.
26. SMSG publications.
27. Recent publications.
28. Articulation of content of SMSG texts, grades 1-3 and 4.
29. SMSG publications.
30. Status reports, recent publications.
31. SMSG publications.
32. Mathematics for the Elementary School - Book K, Teacher's Commentary.
33. Book 1, Student's Text.
34. Book 1, Teacher's Commentary.
35. Book 2, Student's Text.
36. Book 2, Teacher's Commentary.
37. Book 3, Student's Text, Parts I and II.
38. Book 3, Teacher's Commentary, Parts I and II.
39. Grade 4, Student's Text, Parts I and II.
40. Grade 4, Teacher's Commentary, Parts I and II.
41. Grade 5, Student's Text, Parts I and II.
42. Grade 5, Teacher's Commentary, Parts I and II.
43. Grade 6, Student's Text, Parts I and II.
44. Grade 6, Teacher's Commentary, Parts I and II.
45. Mathematics for Junior High School - Volume I, Student's Text, Parts I and II.

46. Volume I, Teacher's Commentary, Parts I and II.
47. Volume II, Student's Text, Parts I and II.
48. Volume II, Teacher's Commentary, Parts I and II.
49. First Course in Algebra - Student's Text, Parts I and II.
50. Teacher's Commentary, Parts I and II.
51. Geometry - Student's Text, Parts I and II.
52. Teacher's Commentary, Parts I and II.
53. Geometry with Coordinates - Student's Text, Parts I and II.
54. Teacher's Commentary, Parts I and II.
55. Intermediate Mathematics - Student's Text, Parts I and II.
56. Teacher's Commentary, Parts I and II.
57. Elementary Functions - Student's Text.
58. Teacher's Commentary.
59. Introduction to Matrix Algebra - Student's Text.
60. Teacher's Commentary.
61. Introduction to Secondary School Mathematics- Volume I, Student's Text, Parts I and II.
62. Volume I, Teacher's Commentary.
63. Volume II, Student's Text, Parts I and II.
64. Volume II, Teacher's Commentary.
65. Introduction to Algebra - Student's Text, Parts I and II.
66. Teacher's Commentary, Parts I and II.
67. Analytic Geometry - Student's Text.
68. Teacher's Commentary.

Programmed Material.

69. Programmed First Course in Algebra (Form H) - Textbook, 2 parts, and Teacher's Commentary (one Part).
70. Response Booklet.
71. Calculus - Textbook, Parts I and II.
72. Teacher's Commentary, Parts I and II.
73. Textbook, Part III.
74. Teacher's Commentary, Part III.
75. Algorithms, Computation and Mathematics - Student's Text.
76. Algorithms, Computation and Mathematics - Teacher's Commentary.
77. Fortran - Student's Text.
78. Fortran - Teacher's Commentary.
79. Algol - Student's Text.
80. Algol - Teacher's Commentary.
81. Book K - Teacher's Commentary, Special Edition.
82. Book 1, Parts I and II - Student's Text, Special Edition.
83. Book 1, Parts I and II - Teacher's Commentary, Special Edition.
84. Developing Mathematics Readiness for Pre-school Programs.
85. Mathematics Through Science - Part I, Student's Text.
86. Part I, Teacher's Commentary.
87. Part II, Student's Text.
88. Part II, Teacher's Commentary.
89. Part III, Student's Text.
90. Part III, Teacher's Commentary.
91. Mathematics and Living Things - Student's Text.
92. Teacher's Commentary.

93. Junior High School Supplementary Unit, Text.
94. Junior High School Supplementary Unit, Commentary.
95. Essays on Number Theory, I.
96. Essays on Number Theory, II.
97. Development of the Real Number System.
98. Probability for Primary Grades, Student Text.
99. Probability for Primary Grades, Teacher's Commentary.
100. Probability for Intermediate Grades, Student Text.
101. Probability for Intermediate Grades, Teacher's Commentary.
102. Introduction to Probability Part I - Basic Concepts, Student Text.
103. Introduction to Probability Part 2, Special Topics, Student's Text.

Supplementary and Enrichment Series.

104. Functions, Student's Text.
105. Circular Functions, Student's Text.
106. Functions, Circular Functions, Teacher's Commentary.
107. The Complex Number System, Student's Text.
108. The Complex Number System, Teacher's Commentary.
109. The System of Vectors, Student's Text.
110. The System of Vectors, Teacher's Commentary.
111. Non-Metric Geometry, Student's Text.
112. Non-Metric Geometry, Teacher's Commentary.
113. Plane Coordinate Geometry, Student's Text.
114. Plane Coordinate Geometry, Teacher's Commentary.
115. Inequalities, Student's Text.
116. Inequalities, Teacher's Commentary.
117. Numeration, Student's Text.
118. Numeration, Teacher's Commentary.
119. Algebraic Structures, Text and Answers.
120. Factors and Primes, Student's Text.
121. Factors and Primes, Teacher's Commentary.
122. Mathematical Systems, Student's Text.
123. Mathematical Systems, Teacher's Commentary.
124. Systems of First Degree Equations in Three Variables, Student's Text.
125. Systems of First Degree Equations in Three Variables, Teacher's Commentary.
126. Radioactive Decay.
127. Absolute Value, Student's Text.
128. Absolute Value, Teacher's Commentary.
129. Mathematical Theory of the Struggle for Life.
130. $1 + 1 = ?$
131. Order and the Real Numbers: A Guided Tour.
132. The Mathematics of Trees and Other Graphs.

Reprint Series.

133. The Structure of Algebra.
134. Prime Numbers and Perfect Numbers.
135. What is Contemporary Mathematics.
136. Mascheroni Constructions.
137. Space, Intuition and Geometry.

138. Nature and History of Π.
139. Computation of Π .
140. Mathematics and Music.
141. The Golden Measure.
142. Geometric Constructions.
143. Memorable Personalities in Mathematics: Nineteenth Century.
144. Memorable Personalities in Mathematics: Twentieth Century.
145. Finite Geometry.
146. Infinity.
147. Geometry, Measurement and Experience.

Studies in Mathematics.

148. Euclidean Geometry Based on Ruler and Protractor Axioms.
149. Structure of Elementary Algebra.
150. Geometry.
151. Concepts of Informal Geometry.
152. Number Systems.
153. Intuitive Geometry.
154. Concepts of Algebra.
155. Brief Course in Math for Elementary School Teachers.
156. Applied Mathematics in the High School.
157. Mathematical Methods in Science.
158. A Brief Course in Mathematics for Junior High School Teachers.
159. In-service Course for Primary School Teachers.
160. Introduction to Number System.
161. Calculus and Science.
162. Some Uses of Mathematics.
163. Mathematical Concepts of Elementary Measurement.
164. Puzzle Problems and Games Project.
165. Reviews of Recent Research in Mathematics Education.

Conference Reports.

166. Elementary School Mathematics.
167. Orientation Conference for SMSG Experimental Centers.
168. Orientation Conference for SMSG Elementary School Experimental Centers.
169. Orientation Conference for Geometry with Coordinates.
170. Future Responsibilities for School Mathematics.
171. Mathematics Education for Below Average Achievers.
172. SMSG: The Making of a Curriculum.
173. Very Short Course in Math for Parents.
174. Philosophies and Procedures of SMSG Writing Teams.

Spanish.

175. Mathematicas Para El Primer Ciclo Secundario, Text - 2 Parts, Volumen I.
176. Mathematicas Para El Primer Ciclo Secundario, Comentario - 2 Parts, Volumen I.
177. Mathematicas Para El Primer Ciclo Secundario, Text - 2 Parts, Volumen II.
178. Mathematicas Para El Primer Ciclo Secundario, Comentario - 2 Parts, Volumen II.

179. Mathematica Para La Escuela Secundaria, Primer Curso de Algebra, Text - 2 Parts.
180. Mathematica Para La Escuela Secundaria, Primer Curso de Algebra, Comentario - 2 Parts.
181. Mathematica Para La Escuela Secundaria, Geometria, Text 2 Parts.
182. Mathematica Para La Escuela Secundaria, Geometria, Comentario - 2 Parts.
183. Mathematicas Para La Escuela Secundaria, Mathematica Intermedia, 2 Parts.
184. Mathematicas Para La Escuela Secundaria, Funciones Elementales.
185. Mathematicas Para La Escuela Secundaria, Introduccion Al Algebra De La Matrices.
186. Mathematicas Para La Escuela Primaria, Grado 4, 2 Parts, Comentario.
187. Mathematicas Para La Escuela Primaria, Grado 5, 2 Parts, Comentario.
188. Mathematicas Para La Escuela Primaria, Grado 6, 2 Parts, Comentario.
189. Estudios De Matematicas, Conceptos de Geometria Intuitiva.
190. El Curso Conciso En Mathematicas Para Los Profesores De Escuela Primaria.
191. Introduccion A Sistemas Numericos.

Soviet Studies.

192. Soviet Studies in the Psychology of Learning and Teaching Mathematics, Volume I - The Learning of Mathematical Concepts.
193. Volume II - The Structure of Mathematical Abilities.
194. Volume III - Problem Solving in Arithmetic and Algebra.

Journals of Abstracts.

195. Investigations in Mathematics Education, A Journal of Abstracts and Annotations, Volume 1.
196. Volume 2.

NLSMA Reports.

197. No. 1, X-Population Test Batteries.
198. No. 2, Y-Population Test Batteries.
199. No. 3, Z-Population Test Batteries.
200. No. 4, Description and Statistical Properties of X-Population Scales.
201. No. 5, Description and Statistical Properties of Y-Population Scales.
202. No. 6, Description and Statistical Properties of Z-Population Scales.
203. No. 7, The Development of Tests.
204. No. 9, Non-Test Data.
205. Calculus of Elementary Functions, Student's Text, Parts I and II.
206. Teacher's Commentary, Parts I and II.
207. Secondary School Mathematics, Sample Chapters.

New Mathematical Library.

208. Numbers: Rational and Irrational by I. Niven.
209. What is Calculus About? by W. W. Sawyer.
210. An Introduction to Inequalities by E. Beckenbach and R. Bellman.
211. Geometric Inequalities by N. D. Kazarinoff.
212. The Contest Problem Book I, Annual High School Contests of the MAA, 1950-1960 compiled and with solutions by C. T. Salkind.
213. The Lore of Large Numbers by P. J. Davis.
214. Uses of Infinity by L. Zippin.
215. Geometric Transformations by I. M. Yaglom, translated from the Russian by A. Shields.
216. Continued Fractions by C. D. Olds.
217. Graphs and Their Uses by O. Ore.
218. Hungarian Problem Book I, Eotvos Competitions 1894-1905 translated from Hungarian by Elvira Rapaport.
219. Hungarian Problem Book II, Eotvos Competitions 1906-1928 translated from Hungarian by Elvira Rapaport.
220. Episodes from the Early History of Mathematics by A. Aaboe.
221. Groups and Their Graphs by I. Grossman and W. Magnus.
222. Mathematics of Choice - How to Count without Counting by I. Niven.
223. From Pythagoras to Einstein by K. O. Friedrichs.
224. The MAA Problem Book II, Annual High School Contests of the MAA, 1961-1965 compiled and with solutions by C.T. Salkind.
225. First Concepts of Topology by W. G. Chinn and N. E. Steenrod.
226. Geometry Revisited by H.S.M. Coxeter and S. L. Greitzer.
227. Invitation to Number Theory by Oystein Ore.
228. Geometric Transformations II by I. M. Yaglom.
229. Elementary Cryptanalysis by Abraham Sinkov.

L. MATERIALS AVAILABLE FREE: Newsletters Nos. 15, 17, 19, 21, 23, 24, 25, 28, 30 and 32; Report No. 1 - The Programmed Learning Project; Report No. 2 - The Special Curriculum Project; Pilot Program on Mathematics Learning of Culturally Disadvantaged Primary School Children; Report No. 3 - A Film-Film Text Study; Report No. 4 - The Special Curriculum Project: 1965-66; Report No. 5 - The Slow Learner Project: The Secondary School "Slow Learner" in Mathematics; Report No. 6 - Preliminary Report on an Experiment with Junior High School Very Low Achievers in Mathematics; Report No. 7 - Final Report on an Experiment with Junior High School Very Low Achievers in Mathematics; Report No. 8 - The Mathematics Through Science Study: Attitude Changes in a Mathematics Laboratory. Available on request from SMSG Headquarters.

M. MATERIALS PURCHASABLE: Prices subject to change. See Newsletter No. 32, March 1970. For New Mathematical Library series, a special school edition is available to students and teachers from the L. W. Singer Co., Inc., 501 Madison Avenue, New York, N. Y. 10022, for $1.29 per copy. A paperbound trade edition is available from Random House, Inc., 457 Madison Ave., New York, N. Y. 10022, at $1.95 per copy, and a hard cover edition priced at $2.95 may be ordered from the Random House School and Library Services, Inc., at the same address.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Spanish, Swedish, Turkish, Chinese, and Portuguese.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Other NLSMA reports in preparation.

Q. PROJECT IMPLEMENTATION: Not answered.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: None.
2. Activities conducted for pre-service and in-service teacher training: None.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Studies in Mathematics, Volumes 1-19.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: NLSMA Reports.
3. Brief abstract of in-house or unpublished research: Other NLSMA Reports in preparation.
4. Additional evaluative data available to interested individuals: Arrangements for this are being planned.

T. PROJECT PUBLICITY: Begle, E. G. "SMSG: The First Decade" The Mathematics Teacher, Volume LXI, No. 3, March 1968, pp. 239-245.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Continuation of new junior high school curriculum project.

V. PLANS FOR THE FUTURE: Phase out of above.

A. PROJECT TITLE: SCIENCE--A PROCESS APPROACH: (AN ELEMENTARY SCHOOL SCIENCE CURRICULUM PROGRAM DEVELOPED BY THE COMMISSION ON SCIENCE EDUCATION OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE).

B. PROJECT DIRECTOR: John R. Mayor, Director; Arthur H. Livermore, Deputy Director; 1515 Massachusetts Avenue, N.W., Washington, D.C. 20005. (202)387-7171.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: The printed materials and kits of materials of Science--A Process Approach.

D. PRINCIPAL PROFESSIONAL STAFF: John R. Mayor, Director; Arthur H. Livermore, Deputy Director; Joseph Dasbach, Project Associate.

E. PROJECT SUPPORT:
1. Organizational agency: American Association for the Advancement of Science.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Commission on Science Education of the American Association for the Advancement of Science.
2. Date and place of Initiation: 1962; Washington, D.C.
3. Overall project purpose: To develop a science program for elementary schools which would stress the development of skills in science processes such as observing, measuring, inferring, formulating hypotheses and so on. Skills are developed through experimental laboratory experiences. Performance objectives are stated and achievement of skills is evaluated. The science content is interdisciplinary.

G. PRESENT COMMERCIAL AFFILIATIONS: Xerox Corporation, 600 Madison Avenue, New York, New York 10022.

H. PROJECT OBJECTIVES: Science--A Process Approach is designed to present instruction which is intellectually stimulating and scientifically authentic. It is based on a belief that the scientific approach to gaining knowledge of man's world has a fundamental importance in the general education of every child. Instructional materials of Science--A Process Approach are prepared for the teacher, while kits of materials are available for use by the children. Topics covered sample widely from the various fields of science, including some exercises in mathematics and the social sciences. The exercises are ordered in a sequence of instruction to provide a developmental progression of increasing competence in the processes of science. Each exercise is designed to achieve clearly stated objectives. Methods for evaluating the pupil achievement and progress are an integral part of the program. A guide for inservice instruction is also provided. These descriptive phrases are taken from a recently published brochure, Science-A Process Approach: Purposes, Accomplishments, Expectations. Copies of the brochure are available upon request.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science for kindergarten through grade 6. Some schools are using the materials also in grades 7 and 8.

K. MATERIALS PRODUCED:
1. Science--A Process Approach, Parts A-E, (grades K-4).
2. Kits of Teaching Aids for Science--A Process Approach, Parts A-E.
3. Process Hierarchy Chart for Science--A Process Approach, Parts A-D.
4. Process Hierarchy Chart for Science--A Process Approach, Parts E-G.
5. Commentary for Teachers.
6. Science--A Process Approach, Guide for Inservice Instruction.
7. Response Sheet for the Guide for Inservice Instruction.
8. Supplement to the Guide for Inservice Instruction.
9. Process Measure for Teachers, Response sheet, Notes to the Instructor and Key to the Response sheet (Form A).
10. Process Measure for Teachers, Response sheet, Notes to the Instructor and Key to the Response sheet (Form B).
11. The Psychological Bases of Science--A Process Approach, 2nd. Edition, 1967.
12. An Evaluation Model and Its Application, 2nd Edition, 1967.
13. Science--A Process Approach, Purposes, Accomplishments, Expectations, 1967.
14. Newsletter, AAAS Commission on Science Education.

L. MATERIALS AVAILABLE FREE: Items 11, 12, 13, and 14. From Commission on Science Education, AAAS, 1515 Massachusetts Avenue, N.W., Washington, D.C. 20005.

M. MATERIALS PURCHASABLE: Items 1, 2, 3, 4, and 5 from Xerox Education Group, 600 Madison Ave., New York, New York 10022. Contact American Association for the Advancement of Science, 1515 Massachusetts Avenue, N.W., Washington, D.C. 20005 for the following: Item 6, Guide for Inservice Instruction - $2.30; Item 7, Response sheet for Guide - $1.00; Item 8, Supplement to Guide - $1.00; Item 9, Process Measure for Teachers, Response sheet, Notes to the Instructor, and Key to the Response sheet (Form A) - $.40; Item 10, Process Measure for Teachers, Response sheet , Notes to the Instructor, and Key to the Response sheet (Form B) - $.40.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Spanish for use in the schools of Puerto Rico. German for use in an experimental program in Gottingen.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Parts F and G will be available in 1970 from Xerox Education Group.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: In 1970-71, probably more than 50,000.
2. Number of students involved: Probably more than 1,000,000.
3. Number of schools involved: Not known.
4. Total number of teachers using any of the materials: Not known.
5. Total number of students using any of the materials: Not known.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Seattle, Portland (Oregon), Tucson, Austin, Tallahassee, Des Moines, Baltimore, Philadelphia, Lakewood (Ohio), Overland Park (Kansas), The University of Chicago Laboratory Schools, Oshkosh, Monmouth (Illinois), American Overseas Dependent Schools (Europe). The program is also being taught in many other school systems.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: A list of recommended consultants is available from AAAS. These consultants in general expect travel expenses and a stipend. Some consultants are also provided by the Xerox Corporation.
2. Activities conducted for pre-service and in-service teacher training: None.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: A *Guide for Inservice Instruction* is available to instructors of in-service classes. Cost $2.30.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies:
   (a) *An Evaluation Model and Its Application*, 1965.
   (b) *An Evaluation Model and Its Application*, 2nd Edition, 1967.
   (c) *Newsletter* of the AAAS Commission on Science Education.
3. Brief abstract of in-house or unpublished research: A supplement to *An Evaluation Model and Its Application*, 2nd Edition, will be published in 1970. This supplement will

include evaluation data for Parts 5, 6, and 7 of the experimental edition of Science--A Process Approach collected in 1966-67, and the data for Parts 6 and 7 collected in 1967-68.
4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY:

1. Henry H. Walbesser, "Curriculum Evaluation by Means of Behavioral Objectives", Journal of Research in Science Teaching, Vol. 1, pp. 296-301, 1963.
2. Arthur H. Livermore, "AAAS Commission on Science Education", Journal of Research in Science Teaching, Vol. 2, pp. 271-282, 1964.
3. Robert M. Gagne, "Elementary Science: A New Scheme of Instruction", Science, Vol. 151, pp. 49-53, 1966.
4. John R. Mayor and Henry H. Walbesser, "Study of Science and Mathematics Program in the Elementary School", American Mathemetical Monthly, Vol. 73, No. 3, March 1966.
5. Arthur H. Livermore, "AAAS Commission on Science Education - Elementary Science Program", Journal of Chemical Education, Vol. 43, p. 270, May 1966.
6. Arthur H. Livermore and John R. Mayor, "Curriculum Changes in Other Sciences", Geotimes, Vol. 13, pp. 21-25, March 1968.
7. Henry H. Walbesser and Heather L. Carter, "Acquisition of Elementary Science Behavior by Children of Disadvantaged Families", Educational Leadership, 25, pp. 741-748, May 1968.
8. Henry H. Walbesser and Heather L. Carter, "Some Methodological Considerations in Curriculum Evaluation", Educational Leadership, 26, pp. 53-54, October 1968.
9. John R. Mayor and Arthur H. Livermore, "A Process Approach to Elementary School Science", School Science and Mathematics, Vol. 69, pp. 411-416, May 1969.
10. John R. Mayor, "Science and Mathematics: 1970's -- A decade of change", The Arithmetic Teacher, Vol. 17, No. 2, February, 1970.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Part Six and Seven of the Experimental Edition were tried out in several schools during 1967-68. On the basis of the results of this tryout the exercises in these parts were further revised by a small group working at AAAS during the summer of 1968. Copy of the final edition of these parts has been prepared for publication in 1970. The Commentary for Teachers has been revised and prepared for publication in 1970. Xerox Corporation published Part D in the fall of 1968 and Part E in the summer of 1969. Kits for these two parts were also prepared by Xerox.

V. PLANS FOR THE FUTURE: The Commentary for Teachers will be published by Xerox in the spring of 1970. Part F and G will be published and kits will be available from Xerox in the summer of 1970. The In-Service program and the Process

Measure for Teachers will be revised and prepared for publication by Xerox in 1971. An experimental edition of A Science Process Instrument will be published in 1970. The Process Instrument is a test to be administered to children individually. It has not been fully validated, and should be used for experimental rather then diagnostic purposes.

A. PROJECT TITLE: SCIENCE COURSES FOR BACCALAUREATE EDUCATION (INTRODUCTION TO NATURAL SCIENCE).

B. PROJECT DIRECTOR: Dr. V. L. Parsegian, Chair of Rensselaer Professor, Rensselaer Polytechnic Institute, Troy, New York 12181. (518)270-6439.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Can arrange for discussion with lecturers.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. V. L. Parsegian; Dr. Alan S. Meltzer, Department of Physics and Astronomy; Dr. Paul R. Shilling, Department of Biology.

E. PROJECT SUPPORT:
1. Organizational agency: Charles F. Kettering Foundation.
2. Funding agency: Charles F. Kettering Foundation.

F. PROJECT HISTORY:
1. Principal originator: Dr. V. L. Parsegian.
2. Date and place of Initiation: 1965; Rensselaer Polytechnic Institute.
3. Overall project purpose: To develop an introduction to science which would be suitable for all college freshmen and sophomores.

G. PRESENT COMMERCIAL AFFILIATIONS: Publisher is Academic Press, Inc., 111 Fifth Avenue, New York, N. Y. 10003.

H. PROJECT OBJECTIVES: To integrate the physical and life sciences as much as possible, and to present these with a historical, philosophical approach and within the context of social interests. Suitable for the potential attorney, economist, business, psychologist, anthropologist, teachers of elementary schools, theologians, as well as majors in the physical sciences.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Integrated science for college freshmen and sophomores. However, a number of high schools as well are using the texts.

K. MATERIALS PRODUCED:
Introduction to Natural Science
1. Part I - The Physical Sciences, by V. L. Parsegian, Alan Meltzer, A. S. Luchins, K. S. Kinerson, 1968 ($10.95)
2. Teacher's Guide for Part I - by V. L. Parsegian (free).

3. Laboratory and Mathematics Supplement for Part I by V. L. Parsegian, K. S. Kinerson, E. H. Luchins, A. S. Luchins, A. S. Meltzer.
4. Part II - The Life Sciences, by V. L. Parsegian, P. R. Shilling, F. V. Monaghan, A. S. Luchins (about $10.95).
5. Teacher's Guide for Part II - by V. L. Parsegian (free).
6. Laboratory Manual for Part II, by V. L. Parsegian, P. R. Shilling, F. V. Monaghan (all from Academic Press, Inc.)

L. MATERIALS AVAILABLE FREE: Write to Academic Press for complimentary copies of the books that may be available. Write to Academic Press or to Dr. V. L. Parsegian at RPI for reprints of published articles. (See item T for published articles on the project).

M. MATERIALS PURCHASABLE: See K, above.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: There has been some discussion of translating it into German, Italian and Spanish.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION: At this writing over 40 colleges and 7 high schools are using the texts. Part II is just becoming available in January 1970.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: We hope to have a Summer Institute in 1970 for teacher preparation. However, the Teacher's Guide available for each part tells how to introduce each lecture and chapter.
2. Activities conducted for pre-service and in-service teacher training: Not answered.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION: Not evaluated by any formal evaluation procedure.

T. PROJECT PUBLICITY:
1. "Baccalaureate Science" by V. L. Parsegian (in Physics Today, March 1967, Vol. 20, No. 3, pp. 57, 58, 59).
2. "A New Approach to Natural Science" (under EDUCATION in BioScience, Vol. 19, No. 7, pp. 633-635, July 1969) (by Dr. Alan S. Meltzer and Dr. Paul R. Shilling).
3. "Giving Relevance To Science" (in The Physics Teacher, October 1969, pp. 379-384) by V. L. Parsegian.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: The activities have concentrated on completing the texts (Part II) and testing them in pilot classes.

V. PLANS FOR THE FUTURE: Plans are underway for a follow-up project to develop courses of study (and texts) that can continue to serve as bridges between the sciences and the humanities and the fine arts. If successful this would continue to be centered at Rensselaer Polytechnic Institute under the direction of V.L. Parsegian.

A. PROJECT TITLE: SCIENCE CURRICULUM IMPROVEMENT STUDY (SCIS).

B. PROJECT DIRECTOR: Robert Karplus, Professor of Physics, Associate Director of The Lawrence Hall of Science, University of California, Berkeley

C. PROJECT HEADQUARTERS:

1. Contact: Herbert D. Thier, Assistant Director, Science Curriculum Improvement Study, Lawrence Hall of Science, University of California, Berkeley, California 94720. (415) 642-4541. The project also maintains trial centers at Teachers College, Columbia University; Michigan State University; University of Oklahoma; University of California at Los Angeles; and University of Hawaii.
2. Special facilities or activities available for visitor viewing: Participants in the SCIS Implementation Program (see Item R) meet with SCIS staff members and visit classrooms in the Berkeley Trial Center schools. Visitors may also make arrangements to attend classes at the SCIS Trial Centers.

D. PRINCIPAL PROFESSIONAL STAFF: Robert Karplus, Director; Herbert D. Thier, Assistant Director; Chester A. Lawson, Director of Life Sciences; Carl Berger, Physicist; Diane Bramwell, Administrative Assistant and Senior Editor; Sylvia Bunshoft, Teacher; David Conrad, Biologist; James Eakin, Schools Coordinator; Jack Fishleder, Implementation Program Leader; Robert Knott, Biologist; Laurence Malone, Biologist; Marshall Montgomery, Coordinator, Equipment Development; George Moynihan, Project Coordinator; Gordon E. Peterson, Biologist; Rita W. Peterson, Evaluation Specialist; John Quick, Film Director; Charlyn R. Sheehan, Teacher; Suzanne Stewart, Newsletter Editor and Editorial Assistant; Sylvester L. Webb, Urban Area Consultant; David Youngdahl, Art Director.
Trial Center Coordinators: Albert B. Carr, University of Hawaii, Honolulu, Hawaii; Glenn Berkheimer, Michigan State University, East Lansing, Michigan; Stanford Davis, University of California, Los Angeles, California; John Renner, University of Oklahoma, Norman, Oklahoma; Mary Budd Rowe, Teachers College, Columbia University, New York.

E. PROJECT SUPPORT:

1. Organizational sponsorship: University of California, Berkeley.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY: The Science Curriculum Improvement Study was established in the winter of 1962 by Robert Karplus, at the University of California, Berkeley. Since that time the project has maintained a full-time staff of physicists, biologists, psychologists, and teachers. The staff has developed ideas for units, tried out these ideas during exploratory teaching in Berkeley Trial Center schools, observed trial edition units being taught by regular classroom teachers, and revised them for final edition.

G. PRESENT COMMERCIAL AFFILIATIONS: Publisher of the final edition units of the SCIS program: Rand McNally & Company, P.O. Box 7600, Chicago, Illinois 60680.

H. PROJECT OBJECTIVES: SCIS usually capsulizes its purposes as the development of scientific literacy. But it is important to delineate exactly what is meant by that term, and how the staff hopes to achieve this goal. An important meaning of scientific literacy is sufficient knowledge and understanding of the fundamental concepts of both the biological and physical sciences for effective participation in twentieth century life. A second implication of scientific literacy is the development of a free and inquisitive attitude and the use of rational procedures for decision-making. In the SCIS program, children learn science in an atmosphere of intellectual freedom, where their own ideas are respected, where they learn to test their ideas by experiment, and where they learn to accept or reject ideas, not on the basis of some authority, but on the basis of their own observations. Ideally, some of these experiences will carry over to other areas of life and allow children to make decisions on a more rational basis after weighing the factors or evidence involved more objectively. Each unit of the SCIS program presents activities which lead to the understanding of important scientific and process-oriented concepts. The sum of these concepts may be considered a sound base from which the scientifically literate person may seek answers to his questions.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: SCIS uses a materials-centered approach in which the elementary classroom actually becomes a laboratory. In their first explorations of a new concept, the children are allowed to manipulate or observe selected materials, sometimes freely in any way they wish and sometimes under the guidance of the teacher. As a result of these preliminary explorations, the children have a new experience--direct physical contact with natural phenomena. As the next step, the teacher introduces the scientific concept that describes or explains what the children have observed. This is called the invention lesson. Following the invention lesson, other experiences are provided that present further examples of the concept. These are called discovery lessons. Through this procedure, the child is expected to recognize that the new concept has applications to situations other than the initial example. In other words, the discovery experiences reinforce, refine, and enlarge upon the concept.

J. SPECIFIC SUBJECTS, GRADE, AND AGE LEVELS: Sequential physical and life science curriculum suggested for grades K-6.

K. MATERIALS PRODUCED:

1. The first year. The first-year units are Material Objects and Organisms. These units have certain common objectives: to sharpen children's powers of observation, discrimination, and accurate desscription.

Material Objects. Common objects and special materials provided in the kit are described by their properties: color, shape, texture, hardness, and weight. Children study these as they observe, manipulate, compare, and even change the form or appearance of objects. All the activities stimulate language development because each child acquires experiences about which he is eager to talk. At the same time, these concepts basic to the science program are introduced and used repeatedly: object, property, material, serial ordering, change, evidence.

Organisms. Children become familiar with some of the requirements for life as they set out seeds and watch the growth of plants. This experience is extended when the class builds aquaria with water plants, fish, and snails. Three natural events occurring in the aquaria are observed and discussed: birth of guppies and appearance of snail eggs; growth of guppies and snails; and death of organisms. When they explore the school yard, nearby park, or nature area, children discover plants and animals living outside the classroom. They are led to the concept of habitat as they compare these land organisms with those living in the aquaria.

2. The second year. The second-year SCIS units are Interaction and Systems and Life Cycles. In both the theme is change, observed either as evidence of interaction or by the development of an animal or plant. Both units require children to add the mental process of interpreting evidence to the observational skills they developed in the first year.

Interaction and Systems. The central concept of the entire SCIS program, interaction, is introduced in this unit. The children's work with objects and organisms in the first year has given them the background necessary for understanding the interaction relationship. Concepts are developed in the unit, as are the children's skills in (1) manipulating experimental equipment (2) reporting observations, and (3) recording observations during experiments. The student manual plays a key role in developing the children's recording skill and assists in introducing them to these major concepts: system, interaction, evidence of interaction, interaction-at-a-distance.

Life Cycles. The investigation of ecosystems begun in Organisms is continued in Life Cycles. The unit, however, focuses on individual organisms, which alone show the characteristics of the phenomenon we call "life." For the time being, the inter-relationships and interdependencies within

BASIC SUBJECT AREAS OF THE SCIS PROGRAM

PHYSICAL SCIENCES	LIFE SCIENCES
Material Objects	Organisms
Interaction and Systems	Life Cycles
Subsystems and Variables	Populations
Relative Position and Motion	Environments
Energy Sources	Communities
Models: Electric and Magnetic Interaction	Ecosystems

the ecosystem are given secondary importance.

3. The third year. The children observe and experiment with phenomena of increasing complexity as they build on the first two years of the SCIS program and move toward an understanding of energy matter, and ecosystems.

Subsystems and Variables. The subsystems concept is introduced to give the children a grouping of objects intermediate between a single object and an entire system. Subsystems may be the grains of sand in a mixture of sand, salt, and baking soda, the salt in a salt solution, or the arm and rivets in a whirly bird system. This concept helps the children as they investigate these and other systems.

Populations. The children's attention in this unit is directed toward populations of organisms rather than to individual plants and animals. They observe the growth, eventual leveling off, and decline of isolated populations. They relate increase in population numbers to reproduction, and population decline to death.

The children's experiences with aquaria and terraria continue the study of ecology begun in Organisms and Life Cycles. They serve as background for the introduction of these important biological concepts: population, plant eater, animal eater, community, predator, prey, food chain, food web.

4. The fourth year. The investigations of the fourth-year make use of the measurement skills and scientific background developed in the first three years.

Relative Position and Motion. Faced with the problems of describing the position and motion of objects in their environment, children become aware that they use reference frames to do so. The Relative Position and Motion unit introduces into the SCIS program activities dealing specifically with spatial relationships. It also enhances the children's abilities to think critically, interpret evidence, and work independently, which are broad process objectives of the entire SCIS program.

Environments. The children design and build terraria at the beginning of the unit to contain several different plants and animals. Because the environmental requirements of the organisms vary, the growth and survival of the organisms differ widely among the containers. These differences can be correlated with variations in environmental factors, such as temperature, amount of water, and intensity of light. The term environment is introduced as the combination of all the environmental factors affecting an organism.

5. The fifth year. The conceptual development of the SCIS program continues with the introduction of energy transfer. In the physical science unit, Energy Sources, energy transfer takes place between interacting physical systems; in the life science unit, Communities, the energy that is transferred from plant, to plant eater, to animal eater in the food chain, is considered. In these units the interactions of objects and of organisms are investigated from a more comprehensive point of view, in which their dynamic interdependence is taken into account.

Energy Sources. The children continue their study of matter and energy in the Energy Sources unit and also extend their skill in conducting scientific investigations. Even though the principle of conservation of energy is not stated, the children's qualitative descriptions of energy transfer from a source to a receiver prepare them for later quantitative investigations of energy exchange.

Communities. In the Communities unit the children investigate the food relations within a community of plants and animals. They first experiment with germinating plants and discover that food stored in cotyledons supports the early development of the seedling. After the cotyledons are consumed, however, another source of food supports the plants' growth. This other source is photosynthesis, the process by which green plants make food when exposed to light. The children observe the feeding behavior of animals in terraria containing various plants and animals such as clover, crickets, isopods, and frogs. They identify the food chains and infer that photosynthesis in green plants not only supplies food for the plants but indirectly also for the animals in the community. The children count the large number of wheat seeds eaten by a few crickets and the few crickets eaten by a single frog. On the basis of these data, the food pyramid is introduced.

6. The sixth year. The last year of the SCIS program represents both a climax and a new beginning. The study of Ecosystems in the life science sequence integrates all the preceding units in both physical and life sciences as the children investigate the exchange of matter and energy between organisms and their environment. The physical science unit, Models: Electric and Magnetic Interactions, introduces the concept of the scientific model, and thereby opens a new level of data interpretation and hypothesis making.

Ecosystems. The children's investigations in the Ecosystems unit make them aware of the roles played by oxygen, carbon dioxide, and water in the maintenance of life. When the children understand the concept of a community interacting with its environment, the term ecosystem acquires its full meaning.

Models: Electric and Magnetic Interaction. The activities in the Models unit are directed toward increasing the children's understanding of electrical and magnetic phenomena both at the level of concrete experiences and at the level of abstract thought. The principal device to accomplish the latter is the concept of scientific model, which is introduced early in the unit and applied in all later parts.

L. MATERIALS AVAILABLE FREE: The SCIS Newsletter is published quarterly. When other free materials are available from the project, they are announced in the current issue of the Newsletter.

M. MATERIALS PURCHASABLE: An SCIS equipment kit is developed for each unit in the program. These include materials to teach a class of 32 children, a teacher's guide, and student manuals. For life science units, order forms are also included to obtain organisms when they are needed. Write to Rand McNally & Company, Customer Service, P.O. Box 7600, Chicago, Illinois 60680, for information on the availability and price of kits. See section K for a list of the units.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: No official translations of SCIS units have been made. Experimental translations are being designed in Israel, Japan, Denmark, Sweden, Canada, Taiwan, Chile, and other countries.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

Sourcebook. An SCIS Sourcebook for teacher education has been developed for the lower elementary grades. Preparation is now underway for the publication of an upper grade sourcebook (see Item R).

Special Education. The Lawrence Hall of Science, in conjunction with the Alameda County Schools and the California School for the Blind, has received a Title III grant to develop a curriculum program in science based on SCIS for visually handicapped children. The project is titled Adapting Science Materials for the Blind. Exploratory teaching of physical and life science units has begun, and the first three units Material Objects, Organisms, and Interaction and Systems are presently being adapted to the needs of the visually handicapped. Materials will be developed to be used in three types of organized educational programs: special classes, such as California School for the Blind; resource rooms in public schools where there are clusters of several blind children; and classes where a single blind child is taught with sighted children. It is expected that the program will eventually affect science teaching of blind children throughout the country. Experience with these adaptations over the next three years should be valuable for any future efforts of adapting the SCIS program to other areas of special education.

Q. PROJECT IMPLEMENTATION: The materials produced by SCIS are being used by schools in practically every part of the country. Some school districts are in the initial pilot phase, using the materials with a selected segment of the district's schools in order to observe and evaluate the effectiveness of this approach to science education. Still others are following through on a planned implementation program. Major urban centers, such as Boston, New York City, Philadelphia, Washington D.C., Cleveland, Cincinnati, Chicago, Milwaukee, Denver, San Francisco, Seattle, and Los Angeles, are using the materials. Smaller urban districts, suburban districts, and rural districts in nearly all geographic sections of the nation have begun using SCIS as their basic elementary science program. Some of these districts are: Flushing, New York; Cushman, Massachusetts; West Caldwell, New Jersey; Wilkes Barre, Pennsylvania; Maryland Heights, Maryland; Ft. Lauderdale, Florida; New Albany, Mississippi; Racine, Wisconsin; Ferndale, Michigan; Grand Rapids, Michigan; Dayton, Ohio; Highland Park, Illinois; Jefferson County, Colorado; Ft. Collins, Colorado; Overland Park, Kansas; Tarkio, Missouri; Moore, Montana; and Mercer Island, Washington. The largest single adoption has been the Archdiocese of Chicago. Other districts have adopted the program and are in the process of phasing in the materials. Among these are: Evanston, Illinois; East Lansing, Michigan; Norman, Oklahoma; Morgan Hill, California; and Berkeley, California. An estimate of the number of children using SCIS, based on kit sales of preliminary editions, is approximately 350,000.

R. TEACHER PREPARATION: The procedures for developing and perfecting the SCIS Teacher Education Program are similar to those being used in developing the elementary science program. Procedures and materials are proposed, subjected to criticism, and tried out in exploratory teaching. The materials and procedures then undergo more extensive testing in the trial centers.

Trial Centers. New approaches to teacher education are developed and tested in the SCIS Trial Centers. The Trial Center Coordinators, Al Carr of the University of Hawaii, Honolulu; John Renner of the University of Oklahoma; Stanford Davis of the University of California at Los Angeles; Mary Budd Rowe of Teachers College, Columbia University; and Glenn Berkheimer of Michigan State University, each develop approaches to in-service education.

SCIS Sourcebook. A sourcebook is being developed which will contain original papers on the theoretical, historical, and psychological foundations of the SCIS program. A number of original papers providing background information in areas of science and education closely related to the SCIS program are being prepared. A trial edition of the primary level SCIS Elementary Science Sourcebook has been published and used since the spring of 1968. It was written under the direction of Dr. Willard Jacobson, Teachers College, Columbia University. The upper-grade trial sourcebook is being prepared under the direction of Dr. John Renner of the University of Oklahoma at Norman. It is planned that a single SCIS sourcebook will be produced as a result of combining and modifying both of these trial editions.

Videotape Program. Teachers have had opportunities to use SCIS materials with small groups of children, and some of these experiences have been videotaped so that teachers can analyze their own work. These tapes will be available to interested school districts and colleges for use in teacher preparation.

Implementation Program. SCIS began an Implementation Program in the fall of 1967. During the school year, university science educators, school district supervisors, and other key people in education visit the project for from one to two weeks and become familiar with the philosophy, methods, and materials of the Science Curriculum Improvement Study. After completion of his study-visit, the science educator will be able to act as consultant to various communities as they plan and set up new science programs and develop teacher education programs. During any one week, from two to four educators are involved in this program. As of February 1970, about 190 science educators had participated in this individualized leadership program. The Study maintains the services of the Implementation Program leader and an Urban Area Consultant, as well as other staff consultants, to assist districts in their problems in helping teachers implement the SCIS program.

SCIS Awareness Conferences. Rand McNally & Company is maintaining consultant services for all districts interested in the SCIS program. Arrangements can be made for such conferences through local Rand McNally representatives. In addition, those districts implementing the SCIS program can make arrangements with Rand McNally for on-going consultant services for teacher education.

CCSS Workshops. The National Science Foundation, through its Cooperative College-School Science (CCSS) program, assists school systems in the training of teachers in a new science program like SCIS with the school district making a commitment of supplying the actual materials to be used by the children. In 1970 there were fourteen such SCIS-CCSS workshops funded by NSF. These projects are located in Berkeley and San Francisco, California; Colorado County Schools; Storrs, Connecticut; Montgomery County, Maryland; Washington, D.C.; the Chicago area; Amherst, Massachusetts; Grand Rapids, Michigan; Brooklyn, New York; Hempstead, Long Island; Oswego, New York; Stony Brook, New York; and Cedar City, Utah.

Leadership Training Programs. Summer Leadership Training Programs in SCIS have been sponsored by the National Science Foundation since 1967. Such workshops have been carried out at the University of Texas, Teachers College, Columbia University, and Michigan State University. During the summer of 1970, leadership people in science education will be trained in SCIS at Michigan State University, the University of Colorado, and San Francisco State College. Science and science education professors, science supervisors, and administrators who receive this special training will become active teacher-education specialists and implementers of the SCIS program.

S. PROJECT EVALUATION: The philosophical view of SCIS toward evaluation has always been best described in the introductory material to a unit. There, the idea is presented of on-going and continual teacher evaluation of the children. As the teacher stops traditional teaching and directs his attention toward observing and listening to the children, he will find the clues he needs to determine how much and how well they understand. When such evaluations need translation into tangible records, the teacher will find alternate forms of evaluation useful. SCIS has recently designed a number of evaluation activities which are currently being implemented on a trial basis in an SCIS Science Workshop for elementary school children. Activities have been designed for use in varying situations. One kind of evaluation activity has been developed to be administered in an atmosphere of active investigation, as an attempt to break away from pencil-and-paper bound tests. A key to evaluation is given for the teacher to check the children's group participation. The children also record their observations and a key to evaluating these is included. Such activities would eventually be designed to measure attainment of major concepts and processes for all grade levels of the SCIS program. Piagetian group tasks are also being tried. This activity attempts to clarify the children's level of development in the transition from reliance on concrete thinking to an ability to reason abstractly. Unlike many such Piagetian tasks, the activity can be administered simultaneously to all children in the classroom. It allows the teacher to make diagnostic assessments with little training. Many observers in the field have reported qualitative behavioral differences in SCIS students as compared to non-SCIS students. Greater curiosity, more persistence in problem-solving, and a greater reliance on evidence are among the traits described, but little quantitative data have been collected. During the workshop, an evaluative interview was tried with individual children working directly with materials. Responses were videotaped and analyzed according to a pre-determined hierarchy. The results of the investigation, when correlated with the children's responses on the two other evaluation forms, will present a tentative answer to the relationship of cognitive development and behavioral traits. In addition to diversifying the forms of evaluation activities, several forms of the interpretation of feedback are also being compared. Because feedback or evaluation activities are often used primarily to generate grades, an effort is being made to find new ways of interpreting the work and behavior of children. Individual differences and individual progress are the focus, rather than sets of scores reflecting a single standard. It is hoped that such multi-phasic approach to evaluation will increase the value of the SCIS program and enable it to fulfill the needs of individualized as well as group instruction.

T. PROJECT PUBLICITY:

1. Conard, David, and Thier, Herbert D. "The Life Sciences--A Short Course for Teachers", The Instructor, Vol. LXXVIII (January 1969), pp. 63-68.
2. Karplus, Robert. "Chemical Phenomena in Elementary School Science", Journal of Chemical Education, Vol. 43 (May 1966), pp. 267-269.
3. Karplus, Robert. "The Science Curriculum Improvement Study", Journal of Research in Science Teaching, Vol. 2 (1964), pp. 293-303.
4. Karplus, Robert. "Teaching Physics in the Elementary Grades", Physics Today, Vol. 17 (October 1964), pp. 34-38.
5. Karplus, Robert, and Thier, Herbert D. "The Science Curriculum Improvement Study", The Instructor, Vol. 74 (January 1965) pp. 43-84.
6. Lawson, Chester A. "The Life Science Program of the Science Curriculum Improvement Study", The American Biology Teacher, Vol. 29, No. 3 (March 1967) pp. 185-190.
7. Rowe, Mary Budd. "Science, Silence and Sanctions", Science and Children, Vol. 6, No. 6 (March 1969) pp. 11-13.
8. Stafford, Donald G., and Renner, John W. "The First-Grade Scientist", Science and Children, Vol. 7, No. 4 (December 1969) pp. 9-11.
9. Thier, Herbert D. "A Look at a First Grader's Understanding of Matter", Journal of Research in Science Teaching, Vol. 3 (1965) pp. 84-89.
10. Thier, Herbert D. "The Involvement of Children in the Science Program", Science and Children, Vol. 2, No. 5 (February 1965).
11. Karplus, Robert, and Thier, Herbert D. A New Look at Elementary School Science. Chicago: Rand McNally & Company, 1967.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Since the 1968 report, when only three SCIS units were available to the public (Material Objects, Organisms, and Interaction), four additional SCIS units were published in preliminary edition: Systems and Subsystems, Relativity, Populations, and Position and Motion. The preliminary edition was intended to lead to a revised, unlimited Final Edition after the complete development of the program. Sales have been far greater than we had anticipated, however, with the results that the units in preliminary edition would have been exhausted long before they were revised. In order to meet the needs of the many school districts throughout the country implementing SCIS, the project has embarked on a final edition publication program. Rand McNally & Company, Chicago, has been chosen as the publisher for the SCIS Final Edition. Development and revisions have continued, and the first final edition units were published in early 1970. Plans for all grade levels for the life science and physical science SCIS programs have been developed and completed (see Item K). Revision for the final edition is being based on feedback received during trial teaching of units and observations of units being taught in preliminary edition. Since the 1968 report, SCIS, in conjunction with the Alameda County Schools and the California School for the Blind, has received a Title III grant to develop an SCIS science program for the visually handicapped (see Item P). An urban area consultant has been added to the staff in order to assist with the special problems that exist in the implementation and teacher training in large urban areas. An SCIS Elementary Science Sourcebook has been published for use in in-service and pre-service teacher education in the lower elementary grades. Preparation is underway for a sourcebook for the upper elementary grades (see Item R). The SCIS Evaluation Program has been developing various forms of evaluation that may be used for classroom teachers under different conditions. An SCIS Science Workshop was held which tried out these new evaluation activities on young children at several grade levels (see Item S).

V. PLANS FOR THE FUTURE: SCIS will continue developing and revising its units for the final edition. It is expected that all grade levels of the physical and life science programs will have been published in final edition by the end of 1971. In addition to the twelve main units of the program (see Item K), optional units may be developed to further the use of the program in individualized classrooms. A final edition of the SCIS Elementary Science Sourcebook, combining material in the trial edition of the primary grade sourcebook and that of the upper-grade sourcebook now being prepared, will be published next year (see Item R). Other aspects of the Teacher Education Program will be receiving special attention in the final phases of the project. Among these are the SCIS Video Tape Project, which is being carried out with the Associated Colleges of the Midwest, housed at Carleton College, Northfield, Minnesota. Tapes of SCIS in public school classes will be made available for use in teacher preparation by interested school districts and colleges. Continued emphasis will be placed on the development of SCIS evaluation techniques. It is hoped that this will lead to the publication of evaluation materials for use in classrooms where SCIS units are taught (see Item S).

A. PROJECT TITLE: SCIENCE FOR NON SCIENCE MAJORS (SNSM).

B. PROJECT DIRECTOR: Dr. Irvin T. Edgar, Science Education Advisor, Pennsylvania Department of Education, Box 911, Harrisburg, Pennsylvania 17126. (717)787-7320.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Experimental schools and pilot schools in the 1970-71 school year.

D. PRINCIPAL PROFESSIONAL STAFF: Joseph E. Anthony, Science Education Advisor; William H. Bolles, Science Education Advisor, Earth and Space Science; Irvin T. Edgar, Science Education Advisor, Biological Science; John J. McDermott, Science Education Advisor, Physical Science.

E. PROJECT SUPPORT:
1. Organizational agency: Commonwealth of Pennsylvania.
2. Funding agency: Commonwealth of Pennsylvania.

F. PROJECT HISTORY:
1. Principal originator: Dr. Irvin T. Edgar.
2. Date and place of Initiation: November, 1968; Harrisburg, Pennsylvania.
3. Overall project purpose: The SNSM Project was initiated to provide guidance and materials for science instruction of students in high school, with emphasis on population, pollution and social problems of science origin.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: The study of science should revolve around the immediate issues and problems of society. Science learnings should not be limited by past definitions or subject divisions of science. Science should be recognized as a vital activity in which students may take a limited part as active learners of science concepts rather than passive consumers of assorted science facts. Science should foster in students the development of flexible habits of thinking and encourage students to discard the habit of bringing pre-conceived solutions to problems they have not yet investigated. Students must understand the ways in which scientific knowledge has been, and is being increased. Students need to view science from an objective point of view, free from the usual disdain for science that is produced by rigorous academic requirements. All students must be helped to recognize their future role as citizens who will control the scientific community and assume responsibility for the influence of science as it shapes society. Teachers are capable of teaching for the objectives they establish for their instruction, and are therefore capable of successfully employing the representative activities provided if they agree with the rationale and purposes set forth in the materials.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations and Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: The SNSM materials were designed specifically for grade 11.

K. MATERIALS PRODUCED:
1. SNSM Working Draft (Guide).
2. SNSM Bibliography.
3. SNSM Scale.
4. SNSM Population Unit.

L. MATERIALS AVAILABLE FREE: Free to Pennsylvania residents. Present supplies are limited for each item: SNSM Working Draft, SNSM Bibliography, SNSM Scale, SNSM Population Unit. Available from: Dr. Irvin T. Edgar, Penna. Dept. of Education Box 911, Harrisburg, Pennsylvania 17126.

M. MATERIALS PURCHASABLE: Printed copies of 1-4 will be available in late 1970.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Additional units on (1) Effects of Drugs, and (2) Pollution.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: Eight teachers - using experimentally.
2. Number of students involved: 400.
3. Number of schools involved: 6.
4. Total number of teachers using any of the materials: 15.
5. Total number of students using any of the materials: 800.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive: Estimated.
7. Name and location of selected schools where the material is being taught: Philipsburg-Osceola School District, Philipsburg, Pa. 16866; Bethlehem Area School District, 1330 Church Street, Fountain Hill, Bethlehem, Pa. 18015; Freedom High School, 3149 Chester Avenue, Bethlehem, Pa. 18017; Coatesville Area High School, Coatesville, Pa. 19320; Penn Manor High School, Millersville, Pa. 17551; Tamaqua Area Senior High School, Tamaqua, Pa. 18202; Rose Tree Media School District, Box 188, Lima, Pa. 19060; Wyomissing Area School District, Evans & Cambridge Ave, Wyomissing, Pa. 19610.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Consultant help is provided by project director and members of the committee that helped in the development of SNSM.

2. Activities conducted for pre-service and in-service teacher training: In-service workshops are used to provide teachers with experience in using the materials. Costs are borne by local school districts. Cost is $50.00 per teacher per week.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: SNSM materials. Cost not yet determined.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? It is being evaluated.

2. Pertinent published research studies: None.

3. Brief abstract of in-house or unpublished research: The SNSM Scale is being used to determine teacher and student attitudes toward the ideas presented in the course. Pre- and post-data will reveal changes in the attitudes of the teachers and students, and the relationship between each teacher's attitude and the class attitude.

4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: None.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: A writing conference is planned for spring of 1970, together with additional in-service workshops. The materials will be published by the fall of 1970.

A. PROJECT TITLE: SECONDARY SCHOOL MATHEMATICS CURRICULUM IMPROVEMENT STUDY (SSMCIS).

B. PROJECT DIRECTOR: Dr. Howard F. Fehr, Teachers College, Columbia University, New York, New York 10027. (212)870-4826.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Experimental classes around Metropolitan New York.

D. PRINCIPAL PROFESSIONAL STAFF: Director - Howard F. Fehr; Assistant Director - James Fey; Research Associates - Jeremy Kilpatrick, Howard Kellogg, Nicolas Branca, John Camp.

E. PROJECT SUPPORT:
1. Organizational agency: Teachers College, Columbia University.
2. Funding agencies: National Science Foundation, U. S. A.

F. PROJECT HISTORY:
1. Principal originator: Howard F. Fehr.
2. Date and place of Initiation: November, 1965; Teachers College.
3. Overall project purpose: Develop a newly constructed secondary school mathematics program for university-bound students, to include a great deal of present university study.

G. PRESENT COMMERCIAL AFFILIATIONS: Teachers College Press; New York, New York 10027.

H. PROJECT OBJECTIVES: The Project is unique in that it is building a curriculum in mathematics for the upper 20% in academic ability that will bring the instruction in line with contemporary conceptions of mathematics and on a par with recently established programs in the Nordic European and Russian States.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Lectures, Seminars, Discussion groups, Training experimental teachers.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics - seventh through twelfth grades. Ages 11½ to 17½ years; upper 20% of academic ability.

K. MATERIALS PRODUCED:

Textbooks and Teachers Commentaries.

Course I	Book I, II (Complete)
Course II	Book I, II (Complete)
Course III	Book I, II (Revised)
Course IV	Book I, II (Experimental, not available to public).

L. MATERIALS AVAILABLE FREE: Bulletin No. 4 describing present status of Project.

M. MATERIALS PURCHASABLE: Textbooks from Teachers College Press, 1234 Amsterdam Avenue, New York, New York 10027. $2.00 per book ($4.00 per course). $2.00 per Teachers Commentary.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Not answered.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Courses V, VI for grades 11 and 12.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: None, entire course is not available.
2. Number of student involved: Experimentally 250.
3. Number of schools involved: 5.
4. Total number of teachers using any of the materials: 200.
5. Total number of students using any of the materials: 6000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Approximate.
7. Name and location of selected schools where the course is being taught: Not for general public information.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Each summer - 6 weeks special training for experimental teachers. NSF Institutes - See NSF announcements.
2. Activities conducted for pre-service and in-service teacher training: Not applicable.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not applicable.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies:
   (a) Fey, James T., PROBLEMS OF VERBAL COMMUNICATION IN MATHEMATICS CLASSES. Unpublished Ph.D. dissertation, Teachers College, Columbia University, 1968. 152 pages.
   (b) Taback, Stanley F., THE CHILD'S CONCEPT OF LIMIT, Unpublished Ph. D. dissertation, Teachers College, Columbia University, 1969.
   (c) Thomas, Laverne, AN ANALYSIS OF STAGES IN THE ATTAINMENT OF THE CONCEPT OF FUNCTION, Unpublished Ph.D. dissertation, Teachers College, Columbia University, 1969.
   (d) Hoban, Brother Michael, C.S.C., TRANSFORMATION GEOMETRY IN THE JUNIOR HIGH SCHOOL, Unpublished Ph.D.

dissertation, Teachers College, Columbia University.

These studies are available now, or will be available shortly, on microfilm and Xerox, from the Xerox Corporation at Ann Arbor, Michigan. In addition, the first study will be published in March by Teachers College Press (Barry Goldberg, Editor, 92 pages).

3. Brief abstract of in-house or unpublished research: Not applicable.

4. Additional evaluative data available to interested individuals: None.

T. PROJECT PUBLICITY: H. F. Fehr and J. T. Fey, "The Secondary School Mathematics Curriculum Improvement Study", American Mathematics Monthly, December 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE: Course IV will be revised in the Summer of 1970, tested again in experimental classes in the 1970-71 school year, and will receive its final revisions in the Summer of 1971. Course V will be written in the Summer of 1971 and then tested and revised twice in the following two years, and the same procedure will be followed for Course VI beginning in 1972. A detailed list of subject matter for these courses is not yet available. These procedures are described in somewhat greater detail in our Bulletin No. 4.

A. PROJECT TITLE: SECONDARY SCHOOL SCIENCE PROJECT (SSSP).

B. PROJECT DIRECTOR: Dr. George J. Pallrand, 10 Seminary Place, Rutgers University, The State University of New Jersey, New Brunswick, New Jersey 08903. (201)247-1766, extension 6874 or 6875.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Examination of materials; classes by special arrangement; discussion with staff members.

D. PRINCIPAL PROFESSIONAL STAFF: George J. Pallrand, Director; Michael D. Piburn, Director of Teacher Training; Letitia Graybill, Professional Associate; Helen M. Markham, Business Manager.

E. PROJECT SUPPORT:
1. Organizational agency: Rutgers University, The State University of New Jersey.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Frederick L. Ferris, Jr.; George J. Pallrand.
2. Date and place of Initiation: April 1963; Princeton University, Princeton, New Jersey.
3. Overall project purpose: To initiate curriculum reform in science at this level.

G. PRESENT COMMERCIAL AFFILIATIONS: Webster Division, McGraw-Hill Book Company.

H. PROJECT OBJECTIVES: Curriculum development: The Project has recently completed work on the interdisciplinary, physical science course Time, Space, and Matter (T. S. M.). The course is divided into nine sequential Investigations, each of which is accompanied by a student book providing a source of observations and data not obtainable in the laboratory. Course content, objectives and procedures are contained in the Teacher Folios which also accompany the Investigations. There is no text--students keep a record of their progress in the course in a notebook--however, a Science Reading Series composed of 22 specially selected readings are provided for background information relevant to questions being investigated. Laboratory work is an integral part of Time, Space, and Matter and equipment and supplies for that work also come in the course "package." Listing of objectives and over-view of program can be found in the Time, Space, and Matter Conspectus.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups, Field trips.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: The physical sciences (geology, astronomy, physics, chemistry and mathematics). Appropriate for grades 8 - 10.

K. MATERIALS PRODUCED:

1. Progress Reports

Course Materials:

2. Student investigation books - 1 - 9.
3. Teacher folios 1 - 9.
4. Laboratory equipment and supplies.
5. Overview Book - A Conspectus.
6. Science reading series 22.

L. MATERIALS AVAILABLE FREE: Publisher's course description pamphlet available from: Webster Division, McGraw Hill Book Company, Manchester Road, Manchester, Missouri 63011.

M. MATERIALS PURCHASABLE: Items 2 through 5 are purchasable from Webster Division of McGraw-Hill (See address above). Information on cost can be obtained from them also.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None, at present.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: 1100 - estimate.
2. Number of students involved: 75,000 - 100,000.
3. Number of schools involved: 500 (rough estimate).
4. Total number of teachers using any of the materials: Unknown.
5. Total number of students using any of the materials: Unknown.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: Write Project for information.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Write to Dr. Michael D. Piburn, Director of Teacher Training, Rutgers University, 10 Seminary Place, New Brunswick, New Jersey 08903, for this information.
2. Activities conducted for pre-service and in-service teacher training: Write Dr. Michael D. Piburn, address above.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Audio and video tapes have been made as teaching materials and Resource Teacher training programs have been held during the past three years. For further information please contact the project.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished research: Evaluation conducted by Dr. Peter Taylor, Department of Educational Psychology of Graduate School of Education, Rutgers University, in cooperation with the Secondary School Science Project. Tests were specifically designed for the study of Time, Space, and Matter.
4. Additional evaluative data available to interested individuals: None at this time.

T. PROJECT PUBLICITY:

1. Ferris, Frederick L. "The Princeton Junior High School Science Project." Journal of Research in Science Teaching, 1:281-284, No. 3, 1963.
2. Pepper, Charles E. "New Way to Teach Science in Secondary Schools." University A Princeton Quarterly, Spring 1965.
3. Keith, Charles W. "Time, Space, and Matter, Pilot Science Program Curriculum Bulletin," Portland Public Schools, Portland, Oregon. May-June 1965, pp. 18-19.
4. Mac Mahan, Horace, Jr. "Princeton Project or ESCP: A Difficult Choice." School Science and Mathematics, 66:86-91, January 1966.
5. Renaud, Jane W. "Time, Space, and Matter." Geotimes, 12:19, April 1967.
6. Pallrand, George J., "Time, Space, and Matter." Earth Science Curriculum Project ESCP Newsletter, pp. 11-12, No. 19, May 1969.
7. Piburn, Michael D., "Investigating the Physical World," Science Activities Publishing Company, in publication.
8. Pallrand, George J., "An Introductory Physical Science Course: Time, Space, and Matter," The Physics Teacher, in publication.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: All project materials were completed and are now available through the publishing company. Resource Teacher training institutes were held and a number of Resource Teachers are available to new teachers throughout the United States. For information please contact the project.

V. PLANS FOR THE FUTURE: Teacher training will be continued through the Resource Teacher program and also to some extent through the Publisher.

A. PROJECT TITLE: SOCIAL STUDIES CURRICULUM PROGRAM, EDUCATION DEVELOPMENT CENTER (EDC).

B. PROJECT DIRECTOR: Peter B. Dow, EDC, 15 Mifflin Place, Cambridge, Massachusetts 02138.

C. PROJECT HEADQUARTERS:
1. Contact: Librarian, EDC.
2. Special facilities or activities available for visitor viewing: Librarian has materials available for inspection. Arrangements can be made for visitors to view films and other audio-visual aids.

D. PRINCIPAL PROFESSIONAL STAFF: Peter B. Dow, Director, Social Studies Curriculum Program, EDC; Roger D. Slather, Associate Director; Lawrence H. Fuchs, Chairman Executive Committee; Kathleen D. Sylva, Elementary Course Director; Naomi Towdim, 7th Grade Course Director; Nona Lyons, 8th Grade Course Director; Lawrence H. Fuchs, 9th Grade Course Director; Anita Gil, "Exploring Human Nature", Course Director; Anita Mishler, Director of Teacher Training; Stephen Ocko, Audio-Visual Director; Dean Whitla and Janet Hanley, Evaluation; Barbara Herzstein, Educational Director.

E. PROJECT SUPPORT:
1. Organizational agencies: None.
2. Funding agencies: NSF, Ford Foundation, Carnegie Corp., Danforth Corp., National Endowment for the Humanities.

F. PROJECT HISTORY:
1. Principal originators: James R. Killian, M.I.T.; Jerrold Zacharias, M.I.T.; Elting E. Morison, M.I.T.; Franklin Patterson, Tufts; Jerome S. Bruner, Harvard.
2. Date and place of Initiation: June 1962; M.I.T., Endicott House.
3. Overall project purpose: "...Called to explore possibilities of social studies curriculum revision, the meeting (in June 1962) was the creation of Jerrold Zacharias...(it was agreed) that the teaching of the general fields of social studies and the humanities was desperately in need of improvement in the elementary and secondary schools of the country.." A Short History of the Social Studies Program, Spring 1965.

G. PRESENT COMMERCIAL AFFILIATIONS: KDI Instructional Systems, Inc.; Curriculum Development Association; National Instructional Television Center; Modern Learning Aids; Universal Educational and Visual Aids.

H. PROJECT OBJECTIVES: The general aims of the program are to carry out research and development of social studies curricula, elementary through senior high; to produce new teaching materials, and to implement the teaching of this curricula. The units are intended to be models that others may follow in their own way, and are not meant to be the final word on social studies curriculum. Highly competent scholars have been deeply involved in all of the units throughout the development process, for one important aim of the curriculum is to base the materials on the best and most up-to-date scholarship in history and the social sciences. The materials are designed to allow the students themselves to participate in the methods of such scholarship. Another aim of the curriculum is to involve students in the important questions and problems of society and history. The staff wants to make the subject matter relevant to young people living in twentieth century America; thus the questions raised and problems discussed have meaning in today's world as well as the past. Children will be presented with data, but must come to their own conclusions, for the curriculum is not provided with "right" answers. The teaching methods used are at least as important as content. "Discovery" or "inductive" learning is crucial to the pedagogy of the materials. For this reason, the textbook has been abandoned and a variety of written and other instructional materials put in its place. Films, tapes, slides, games, artifacts, original documents, and a number of manipulative devices are used throughout the units in an effort to teach children who learn best through media other than print. Since the staff hopes the program will be able to bring real change in American's schools, contact with teachers through implementation programs is one of the prime objectives. Their past and present activities in this line are described in Section R, and the staff is currently making plans to expand the program in this important area.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups, Films, Tapes, Slides, Games, 3-dimensional materials, Artifacts, Original documents, Other manipulative devices.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Social sciences (anthropology, sociology, psychology, economics); behavioral biology, political science, and history; grades 5-12.

K. MATERIALS PRODUCED:

1. Man: A Course of Study - Grade 5. This one year course is based on three questions:
    (a) What is human about human beings?
    (b) How did they get that way?
    (c) How can they be made more so?

In part 1 of the course, fundamental questions about the nature of man are explained by comparing and contrasting the human life with the life cycle of the salmon, the behavior pattern of herring gulls and the behavior of the baboons.

In part 2, students investigate the concept of culture through a study of the Netsilik Eskimo.

2. Inventing the Western World - Grade 7.

"The Death of a Republic: A Study from Roman History". This unit focuses on Rome in the first century B.C., the time of the end of the republic and the dictatorship of Caesar. The issues raised have meaning in today's world: the corruption of power, civil liberties in conflict with state authority, tradition as a salutary check or as a stumbling block to innovation, war as an extension of politics, the principles of republicanism in conflict with the emerging power of autocracy. Children read original documents and the writings of ancient Romans; they participate in elections; they hear speeches--but the course offers no definitive answers as to why the Republic collapsed.

3. From Subject to Citizen - Grade 8.

"Queen Elizabeth: Conflict and Compromise". This unit examines a number of conflicts--political, social, and economic-between the Crown and its subjects. From such conflicts and subsequent compromises, the English and American political systems developed. "The King Versus the Commons". Charles I did not see the necessity for compromise. This unit deals with the period from approximately 1625-1688, and is a study of the breakdown of the King's power and the consequent development of a viable arrangement between the King and Parliament based on law. "The Emergence of the American." This unit examines what happened when English social and political ideas were transplanted to a new setting. The unit focuses on individuals who settled the land and examines how the Englishmen who first came to America were changed after a century and a half in the New World. "The Making of the American Revolution". After this long period of developing independence, Americans had some pretty definite ideas about how they should be governed, and would not accept being challenged by a Parliament 3,000 miles away. Students examine the prelude to the outbreak of war and try to answer the question, "How do men come to oppose governmental authority, even to the point of war?". "We, The People". In this unit students study the Constitution, as one step in the attempts to make the political system work. The central question asked is "How does the Constitution help the citizen?" Events studied take place in the present as well as the past.

4. The American Experiment - Grade 9.

"Irish-Americans". Three main questions are raised in the Irish unit: What is the relationship of religious conflict to politics in the United States? How did the poverty of the Irish affect their political behavior? How did the Irish affect the politics of all Americans?

"The Afro-Americans". The central question of this unit is "How, in the face of persistent and pervasive persecution, has the Afro-American survived and begun to build a culture and identity of his own?" The approach to an answer to this question focuses on politics from slave times to the civil rights movement.

5. Modernization - Grade 10.
This series of units deals with change in society during the past two centuries and raises crucial issues for young people living in today's highly technological world. The theme of the course is modernization. Through a study of contemporary documents--letters, diaries, speeches, etc.--students will see what people in this changing world of the past experienced and how they adjusted to life in an industrial order.

6. Black and White America: The Struggle for Identity and Power - Grades 9-12.
This 6-8 week unit focuses on the interactions of black and white Americans particularly, on authority and power relationships. It is being developed for use in secondary school social studies, U.S. history, or civics courses.

7. One Nation, Indivisible? This course, consisting of five lessons on racial conflict in America, developed from the original one week telecast viewed by 50,000 classrooms in May, 1968. The project was the result of cooperation among the EDC Social Studies Curriculum Program, National Educational Television, WGBH-TV, Newsweek, and the ABC, CBS, and NBC television networks.

L. MATERIALS AVAILABLE FREE:
1. Informational brochure and price list, from project headquarters.
2. Background information on course, from project headquarters.
3. Informational brochure and price list, from KDI Instructional Systems, Inc., 1810 MacKenzie Drive, Columbus, Ohio 43221.

M. MATERIALS PURCHASABLE: All course and teacher-training materials and teaching films. Write to project headquarters for prices.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None at present.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
1. Inventing the Western World: Athens and Sparta - Grade 7.
2. Exploring Human Nature. A full-year course in behavioral biology for secondary schools.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course? Not applicable.
2. Total number of teachers using any of the materials: 1800.
3. Total number of students using any of the materials: 35000.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: Contact project headquarters for names of schools.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Social Studies Curriculum Program's in-house workshops are held irregularly through the year.
2. Activities conducted for pre-service and in-service teacher training: Summer institutes to train workshop leaders. Workshop programs throughout the year involving all teachers using the courses.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Seminars for Teachers for "Man: A Course of Study," approximate cost: $3.50; 6 teacher-training films for loan only at present.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by the Harvard Office of Tests.
2. Pertinent published research studies: Curiosity, Competence, Community: An Evaluation of "Man: A Course of Study".
3. Brief abstract of in-house or unpublished research: Evaluation data on all courses are available.
4. Additional evaluative data available to interested individuals: Contact appropriate course director or evaluation director at project headquarters.

T. PROJECT PUBLICITY:

"What Makes Humans Human", American Education, May 1970.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Continued development of all courses and teacher-training programs. Publication of Man: A Course of Study and from Subject to Citizen. Development of plans for 6th grade course and additional elementary and secondary courses.

V. PLANS FOR THE FUTURE:

Not answered.

A. PROJECT TITLE: SOCIOLOGICAL RESOURCES FOR THE SOCIAL STUDIES (SRSS).

B. PROJECT DIRECTOR: Dr. Robert C. Angell, Executive Director, Sociological Resources for the Social Studies, 503 First National Building, Ann Arbor, Michigan 48108. (313)665-9147.

C. PROJECT HEADQUARTERS:
1. Contact: Project Director.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Robert C. Angell, Executive Director; Joan Barth, Editor; James S. Eckenrod, Educational Associate; Graeme S. Fraser, Staff Sociologist; William M. Hering, Jr., Assistant Director for School Liaison; Deborah Linderman, Editor; Robert S. McCargar, Staff Sociologist; Beverly Parker, Administrative Assistant; Jane Schiller, Associate Editor; Thomas J. Switzer, Educational Associate.

E. PROJECT SUPPORT:
1. Organizational agencies: American Sociological Association.
2. Funding agencies: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Committee on the Social Studies Curriculum of American Secondary Schools (Dean Neal Gross, Graduate School of Education, University of Pennsylvania, Chairman), American Sociological Association.
2. Date and place of Initiation: August 1, 1964; Dartmouth College.
3. Overall project purpose: To improve the quality and increase the quantity of sociological materials suitable for the high school curriculum.

G. PRESENT COMMERCIAL AFFILIATIONS: Allyn and Bacon, publishers, 470 Atlantic Avenue, Boston, Mass. 02210; Film Central, optional transparencies, 373 West Bennett, Saline, Mich. 48176; Audio-Visual Education Center, University of Michigan, teacher training film, Ann Arbor, Mich. 48104; Dimension Films, optional classroom film, 733 North La Brea, Los Angeles, Calif. 90038.

H. PROJECT OBJECTIVES: There are two principal objectives. The first is to provide a sociologically sound variety of interesting materials for senior high school social studies teachers. The second is to cultivate in the students an inquiry stance by involving them actively in class investigations and critiques. These objectives are stated in the introductory sections of all of our instructors' guides and are either explicit or implicit in the early pages of our student texts.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Discussion groups, simulation, small group experiments, survey research, classroom exercises, homework problems.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Sociology, social problems, problems of democracy, economics, government, psychology, American history, world cultures. 11th and 12th grades, ages 16-19, all ability levels.

K. MATERIALS PRODUCED:

1. Images of People.
2. Testing for Truth: A Study of Hypothesis Evaluation.
3. Leadership in American Society: A Case Study of Black Leadership.
4. The Incidence and Effects of Poverty in the United States.

L. MATERIALS AVAILABLE FREE: Allyn and Bacon will supply single copies of the student text only to interested teachers. The addresses of the regional offices of Allyn and Bacon are: Northern Division, Rockleigh, New Jersey 07647; Southwestern Division, Elm at Houston, Dallas, Texas 75202; Southeastern Division, 695 Miami Circle, N.E., Atlanta, Georgia 30324; and Western Division, Ralston Park, Belmont, California 94002.

M. MATERIALS PURCHASABLE: The following are the prices to schools for ten student texts (an instructors' guide comes free). The address is Advertising Department JES, Allyn and Bacon, Inc., 470 Atlantic Avenue, Boston, Massachusetts 02210. Numbers 1 and 2: $3.63 per set. Numbers 3 and 4: $5.73 per set.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: No plans for translation.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. Inquiries in Sociology.
2. Cities and City Life.
3. Life in Families.
4. Racial and Ethnic Relations.

Episodes:

1. Roles of Modern Women.
2. Social Factors Favoring Democracy.
3. The Generation Gap.
4. The Difference Between Two and Three: Family Size and Society.
5. From Family and School to Work.
6. Simulating Social Conflict.
7. Meritocracy.
8. Analyzing Modern Organizations.
9. The Case of the Non-Patient.

10. Looking at the Social World Through Tables.
11. Divorce in the United States.
12. Values in Mass Communication.
13. Small Group Processes.
14. Puerto Rico: A Case Study in Population Change.
15. Social Mobility in the United States.
16. What Is? Why Is It? How Do We Know? Analyzing Views on Civil Liberties.
17. Soviet Society.
18. Cities.
19. Intergenerational Family Relationships.
20. Statistical Statements in Social Science.
21. The Kid Who Had a Thing for Lincolns: A Study of Juvenile Delinquency.
22. Class and Race in the United States.
23. Social Change: The Case of Rural China.
24. Family Variations: Time and Culture.
25. Sociology of Religion.
26. Family Roles.
27. Migration Within the United States.
28. Science and Society.

Q. PROJECT IMPLEMENTATION: Sales are just beginning.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: None at present.
2. Activities conducted for pre-service and in-service teacher training: SRSS stimulated a number of universities and colleges to apply for summer and in-service institutes. There are approximately five each summer and five each year supported by the National Science Foundation.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Our teacher training film will be available for rental or purchase from the Audio-Visual Education Center, University of Michigan Ann Arbor, Michigan 48104, by March, 1970. Purchase price and rental cost have not yet been set.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated: Yes, by Project Staff and the Psychological Corporation.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research:
    (a) F. Lincoln Grahlfs, "A New Sociology Course: Some Results of the Field Test."
    (b) William M. Hering, Jr., "Student Learnings from Sociology Project Materials According to Teacher Preparation in Sociology."
    (c) Graeme S. Fraser and Thomas J. Switzer, "Inquiries in Sociology: Teachers' and Students' Reactions."

4. Additional evaluative data available to interested individuals: All evaluative reports are on the national trials of our materials. Since the materials are revised in the light of these evaluations, they are not relevant to the success of the materials in their published form.

T. PROJECT PUBLICITY:

1. Indiana Social Studies Quarterly, Vol. XX, No. 3, Winter 1967-68.

2. Thomas Switzer and Everett K. Wilson, "Nobody Knows the Trouble We've Seen: Launching a High School Sociology Course," PHI DELTA KAPPAN, February 1969.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Besides the first four published units, called episodes, twenty-six other episodes have been written and are in various stages of trial and revision. A one-semester sociology course entitled INQUIRIES IN SOCIOLOGY is now going to press, and three of seven projected readings books have gone to press.

V. PLANS FOR THE FUTURE: It is expected that by August 1971, the sociology course, thirty episodes, and seven paperback books of readings will have been submitted to Allyn and Bacon. The staff will disband at that time.

A. PROJECT TITLE: SOUTHEASTERN PENNSYLVANIA OUTDOOR EDUCATION CENTER.

B. PROJECT DIRECTOR: Larry B. Stratton, S. E. Pennsylvania Outdoor Education Center, Sycamore Mills Road, Media, Penna. 19063. (215)566-9133.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: a. Teaching - Administrative Complex. b. Field Study Areas. c. Learning Resource Center for Outdoor Education. d. Library.

D. PRINCIPAL PROFESSIONAL STAFF: Larry B. Stratton, Director; Robert A. Garawski, Ass't Director; Louis Ritrovato, Field Instruction Coordinator; Kenneth Ziegler, Learning Resource Center Coordinator; Lilly Berg, Teacher-Naturalist; Mary Jane Wicks, Adm. Secretary; Alice Potter, Curriculum Development Secretary.

E. PROJECT SUPPORT:
1. Organizational agencies: U. S. Office of Education; Pennsylvania Department of Education; Rose Tree Media School District.
2. Funding agencies: U. S. Office of Education - Title III, E. S. E. A.; Pennsylvania Department of Education - Title III Office.

F. PROJECT HISTORY:
1. Principal originators: Rose Tree Media School District; Dr. Stanley C. Campbell, Superintendent.
2. Date and place of Initiation: June 1966; John J. Tyler Arboretum, Lima, Penna.
3. Overall project purpose: To develop an ecologically knowledgable and conservation conscious citizenry through outdoor education.

G. PRESENT COMMERCIAL AFFILIATIONS: No commercial affiliations at this time.

H. PROJECT OBJECTIVES:
1. To provide for learning experiences in the outdoors leading to an understanding of the need for the preservation and for the wise use of the natural environment.
2. To make conservation education a part of existing instructional programs in the area through the development and evaluation of curricular materials and practices in outdoor education.
3. To train area teachers in the use of the outdoors as a teaching-learning resource.

4. To initiate and facilitate vocational training in horticulture, landscaping and greenhousing in the two-county area.
5. To provide consultive services to area schools for the evaluation, development and use of available areas for outdoor education purposes.
6. To continue the study and development of the educational potential of the Tyler Arboretum and the Ridley Creek State Park.
7. To provide special programs in conservation, natural history, ecology and gardening for appropriate adult groups in the area.
8. To act as a significant and cooperating educational force in the conservation of area natural resources.
9. To provide an Intrepretive Nature Center available for use throughout the year by area school children, organizations, and adults.
10. To foster a variety of research activities in environmental sciences for all segments of the community.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Lectures, Seminars, Discussion groups, Field trips, Specific and unique curriculum materials.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: All ability levels - K through Graduate school.

K. MATERIALS PRODUCED:
1. Nine Interdisciplinary Curriculum Guides: art, elem. science, sec. science, elem. math., sec. math., elem. social studies, sec. social studies, elem. language arts, sec. lang. arts.
2. 459 Single page field trip activity sheets and follow-up activities.
3. Level I Animal Theme - single unit curriculum guides (24 units).
4. Jr. High - Sr. High Activities.
5. Undergraduate Pilot Outline Syllabus for field botany course for teachers.
6. Graduate School Curriculum - Teacher Training Institute Syllabus.
7. Program Description.
8. Nine Vocational Horticulture Units.
9. Academically Talented Student Activities: Tree Buds, Insect Taxonomy, Stream and Pond Comparison, Tree Taxonomy, Soil Comparisons, Winter is not Dead.

L. MATERIALS AVAILABLE FREE: All are available free at this time.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED:
None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
Special Education Materials.
Single unit curriculum guides Levels II-III Animals.
(Other themes to be developed: plants, man's relationship to his environment, soil, water, air, conservation of natural resources)
Revised single page field trip activity sheets & follow-up materials.
Secondary social studies unit (Man & His Natural Environment).
Secondary science activities.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: We do not have a separate course as such.
2. Total number of teachers using any of the materials: About 4100.
3. Total number of students using any of the materials: Approximately 100,000 to 150,000.
4. Are the totals stated in 1, 2 and 3 estimated or definitive? Estimated.
5. Name and location of selected schools where the course is being taught: Does not apply.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Please request Program Description from project director.
2. Activities conducted for pre-service and in-service teacher training: All financed at present through Title III. For description of activities please request Program Description.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: All materials are free at present for the: Teacher Training Institutes, Student Teacher Training Program, In-Service Teacher Training Program.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated? Yes, by project staff and Pennsylvania State Department of Education.
2. Pertinent published research studies: None available at this time.
3. Brief abstract of in-house or unpublished research: Most of our research pertains to the internal evaluation of effectiveness of various aspects of our program. These findings, plus additional pertinent information, will be published as part of our final report to Title III E. S. E. A. when our Operational Grant expires.

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4. Additional evaluative data available to interested individuals: Yes. By direct contact to our Center.

T. PROJECT PUBLICITY:

1. Garawski, Robert. "Classrooms Without Walls", Pennsylvania School Journal, CXVIII (December 1969), pp. 113+.
2. Greene, Kingsley. "Classrooms Without Walls", The American Biology Teacher XXIX (March 1967), pp. 211-216.
3. Gehret, Kenneth. "An Arboretum is An Open Air Classroom", The Christian Science Monitor LIX (July 8, 1967), p.7.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Please request Program Description.

V. PLANS FOR THE FUTURE: Please request Program Description.

A. PROJECT TITLE: SURVEY OF RECENT EAST EUROPEAN LITERATURE IN SCHOOL AND COLLEGE MATHEMATICS.

B. PROJECT DIRECTOR: Professor Izaak Wirszup, Department of Mathematics, Eckhart Hall 413, The University of Chicago, Chicago, Illinois 60637. (312)643-0800, Ext. 2741.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: A library consisting of over 7000 books and periodicals, principally Russian, on mathematics and its applications, mathematics education, science and science education, education and educational psychology.

D. PRINCIPAL PROFESSIONAL STAFF: Harvey Edelberg, Editorial Assistant.

E. PROJECT SUPPORT:
1. Organizational sponsorships: University of Chicago, Department of Mathematics.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: A.F. Bausch, W.H.L. Meyer, A.L. Putnam, I. Wirszup.
2. Date and place of Initiation: 1956; University of Chicago.
3. Overall project purpose: To answer urgent need to make available information and materials in mathematics and mathematics education from East European sources.

G. PRESENT COMMERCIAL AFFILIATIONS: Publishers: D.C. Heath & Co., Holden-Day, Pergamon Press, Academic Press, The M.I.T. Press.

H. PROJECT OBJECTIVES: The SURVEY is the only organized project in the United States which studies foreign mathematics education. Its main purposes are (1) to study current developments in teaching mathematics at all levels in the Soviet Union and other East European countries, (2) to make accessible these studies and other relevant information to projects for improving mathematics education in the U.S. and to the mathematical community, and (3) to publish for U.S. teachers and students some of the best materials from these sources.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Not applicable.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS. Mathematics and mathematics education. Research in the psychology and methods of learning and teaching mathematics from kindergarten through college level.

K. MATERIALS PRODUCED: Survey publications by D.C. Heath & Co., 285 Columbus Avenue, Boston, Massachusetts 02116:

Titles in the series Topics in Mathematics are:

1. Algorithms and Automatic Computing Machines by B.A. Trakhtenbrot.
2. Areas and Logarithms by A.I. Markushevich.
3. Computation of Areas of Oriented Figures by A.M. Lopshits.
4. Configuration Theorems by B.I. Argunov and L.A. Skornyakov.
5. Equivalent and Equidecomposable Figures by V.G. Boltyanskii.
6. The Fibonacci Numbers by N.N. Vorobyov.
7. How to Construct Graphs by G.E. Shilov, with Simplest Maxima and Minima Problems by I.P. Natanson.
8. Hyperbolic Functions by V.G. Shervatov.
9. Induction in Geometry by L.I. Golovina and I.M. Yaglom.
10. Introduction to the Theory of Games by E.S. Venttsel.
11. The Method of Mathematical Induction by I.S. Sominskii.
12. Mistakes in Geometric Proofs by Ya. S. Dubnov.
13. Proof in Geometry by A.I. Fetisov.
14. Summation of Infinitely Small Quantities by I.P. Natanson.
15. What is Linear Programming? by A.S. Barsov.
16. Convex Figures and Polyhedra by L.A. Lyusternik.
17. Eight Lectures on Mathematical Analysis by A. Ya. Khinchin.
18. Multicolor Problems by E.B. Dynkin and V.A. Uspenskii.
19. Problems in the Theory of Numbers by E.B. Dynkin and V.A. Uspenskii.
20. Random Walks by E.B. Dynkin and V.A. Uspenskii.
21. Infinite Series by A.I. Markushevich.

In Press:

22. Geometric Constructions in the Plane by B.I. Argunov and M.B. Balk.
23. Geometry of the Straightedge and Geometry of the Compass by S.I. Zetel.
24. Isoperimetry: Maximal and Minimal Properties of Geometric Figures by D.A. Kryzhanovskii.
25. Probability and Information by A.M. Yaglom and I.M. Yaglom.

Survey publications by the School Mathematics Study Group (as volume IV of Studies in Mathematics); available from A.C. Vroman, Inc., 2085 E. Foothill Blvd., Pasadena, California 91109:

26. Geometry by B.V. Kutuzov.

Survey publications by Holden-Day, Inc., 728 Montgomery Street, San Francisco 11, California:

27. Challenging Mathematical Problems with Elementary Solutions, vol. I: Combinatorial Analysis by A.M. Yaglom and I.M. Yaglom.

28. Challenging Mathematical Problems with Elementary Solutions, vol. II: Various Branches of Mathematics by A.M. Yaglom and I.M. Yaglom.

Survey publications by Pergamon Press, Inc., Maxwell House, Fairview Park, Elmsford, New York 10523.

29. Envelopes by V.G. Boltyanskii.
30. Shortest Paths by L.A. Lyusternik.
31. Successive Approximation by N. Ya. Vilenkin.
32. Systems of Linear Equations by B.E. Margulis.

Survey publications by Academic Press, 111 Fifth Avenue, New York, New York 10003:

33. Geometric Transformations (Volume 1: Euclidean and Affine Transformations) by P.S. Modenov and A.S. Parkhomenko.
34. Geometric Transformations (Volume 2: Projective Transformations) by P.S. Modenov and A.S. Parkhomenko.

Survey translations and adaptations from the Russian series Bibliotechka fiziko-mathematicheskoi shkoly, under the editorship of Professor I.M. Gelfand, published by the M.I.T. Press under the series title Library of School Mathematics, The M.I.T. Press, Cambridge, Massachusetts 02142:

35. The Method of Coordinates by I.M. Gelfand, E.G. Glagoleva and A.A. Kirillov.
36. Functions and Graphs by I.M. Gelfand, E.G. Glagoleva and E.E. Shnol.
37. Problems in Elementary Mathematics; Sequences, Combinations, Limits by S.I. Gelfand, M.L. Gerver, A.A. Kirillov, N.N. Konstantinov and A.G. Kushnirenko.

The School Mathematics Study Group at Stanford University and the Survey of Recent East European Mathematical Literature at the University of Chicago are publishing jointly a series of 15 volumes of SURVEY translations under the title Soviet Studies in the Psychology of Learning and Teaching Mathematics. The editors of the series are Jeremy Kilpatrick of Colombia University and Izaak Wirszup of the University of Chicago.

Available from A.C. Vroman, Inc., 2085 E. Foothill Blvd., Pasadena, California 91109:

38. Volume I: The Learning of Mathematical Concepts.
39. Volume II: The Structure of Mathematical Abilities.
40. Volume III: Problem Solving in Arithmetic and Algebra.

In Press (to appear in 1970-71):

41. Volume IV: Problem Solving in Geometry.

42. Volume V: The Development of Spatial Abilities.
43. Volume VI: Instruction in Problem Solving.
44. Volume VII: Teaching Arithmetic in Elementary School.
45. Volume VIII: Methods of Teaching Mathematics.
46. Volume IX: Problem-Solving Processes of Mentally Retarded Children.
47. Volume X: Teaching Mathematics to Mentally Retarded Children.
48. Volume XI: Analysis and Synthesis as Problem Solving Methods.
49. Volume XII: Problems of Mathematical Instruction.
50. Volume XIII: Analyses of Reasoning Processes.

L. MATERIALS AVAILABLE FREE: Information on Survey publication programs is available from Project Headquarters.

M. MATERIALS PURCHASABLE: Items 1 - 40 are available from publishers listed in Section K.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Russian.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: English.

P. ADDITIONAL MATERIALS BEING DEVELOPED: See Section V.

Q. PROJECT IMPLEMENTATION: Not applicable.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Not applicable.
2. Activities conducted for pre-service and in-service teacher training: Not applicable.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Items 1 - 40 listed in Section K.

S. PROJECT EVALUATION: Not applicable.

T. PROJECT PUBLICITY: Not applicable.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:
1. Publication of the SMSG - SURVEY series: Soviet Studies in the Psychology of Learning and Teaching Mathematics.
2. Publication by The M.I.T. Press of three volumes in the new series of SURVEY books entitled Library of School Mathematics.
3. Study of the Soviet special Secondary Schools for the Mathematically Gifted.
4. Study of the new Soviet school mathematics curricula.

V. PLANS FOR THE FUTURE:

SURVEY translations and adaptations in preparation for publication:

1. Popular Lectures in Mathematics:
   - (a) Bakelman, I. Ya., Inversion.
   - (b) Fomin, S.V., Systems of Counting.
   - (c) Kogan, B. Yu., Applications of Mechanics in Geometry.
   - (d) Lyubich, Yu. I., Shor, L.A., Kinematic Method in Geometric Problems.
   - (e) Shilov, G.E., The Musical Scale and Its Structure.
   - (f) Sobol, I.M., The Monte Carlo Method.
   - (g) Shreider, Yu. A., What is Distance?
   - (h) Uspenskii, V.A., Pascal's Triangle.
   - (i) Vorobyov, N.N., Tests for Divisibility.
   - (j) Yaglom, I.M., Unusual Algebra.

2. Other books:
   - (a) Fetisov, A.I.,
     - Volume I: Transformation Geometry in the Plane.
     - Volume II: Solutions to Problems of Volume I.
     - Volume III: Transformation Geometry in Space.
   - (b) Khinchin, A. Ya., Elements of the Theory of Numbers.
   - (c) Ostrovskii, A.I., Kordemskii, B.A., Geometry Helps Arithmetic.
   - (d) Shkolnik, A.G., Dividing the Circle.
   - (e) Elkonin, D.B., Davydov, V.V., Potential for Learning Mathematics with Respect to Age Level.
   - (f) Itelson, L.B., Mathematical and Cybernetic Methods in Education.
   - (g) Krutetskii, V.A., Psychology of Mathematical Abilities of Schoolchildren.
   - (h) Landa, L.N., Algorithms and Teaching.
   - (i) Menchinskaya, N.A., Moro, M.I., Questions on Methods and Psychology of Teaching Arithmetic in the Elementary Grades.
   - (j) Moro, M.I., Independent Work for Pupils in Arithmetic Lessons in the Elementary Grades.
   - (k) Pchelko, A.S., Foundations of Methodology Used in Elementary Mathematics Instruction.

A. PROJECT TITLE: TEACHER'S AUTOMATED GUIDE (TAG).

B. PROJECT DIRECTOR: Dr. George S. Ingebo, Director Educational Research and Testing, Portland Public Schools, 631 Northeast Clackamas Street, Portland, Oregon 97208. (503)234-3392, ext. 223, 335.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: One remote station (consisting of character generating cathode ray tube display, a screen, typewriter keyboard and a teleprinter) is in operation at Rice Elementary School. The Cybex Keysort deck "hand computer" will also be available for visitor viewing.

D. PRINCIPAL PROFESSIONAL STAFF: Robert Coffin, director of data processing; James Garlock, curriculum consultant; Gus Dindia, principal of Rice Elementary; Thomas S. Lydon, principal of Wilcox Elementary School; Barbara Raz, basic language programmer; John S. Neeley, Franklin High School; Glen Hampshire, Adams High School.

E. PROJECT SUPPORT:
1. Organizational agency: Portland Public Schools.
2. Funding agencies: Originally Louis W. and Maud Hill Family Foundation, now district.

F. PROJECT HISTORY:
1. Principal originator: Donald W. Stotler, Supervisor of Science.
2. Date and place of Initiation: June 1964; Portland Public Schools.
3. Overall project purpose: To develop a branching, self-renewing process-oriented science curriculum.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: To experimentally develop an automated, self-renewing teachers' guide whereby individual pupil data and curriculum alternatives are made accessible to teachers through the computer system. Essential features of the program include ready access to background data on students and their readiness to learn; a wide variety of curriculum activities based on stated behavioral objectives; and a provision for feedback of both pupil and curriculum information to make the system self-correcting and increasingly useful as a professional tool for the teacher.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Laboratory investigations, Discussion groups, Integration with community agencies and industrial labs.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Science K-4 for a Pilot Program. Expansion K-12 for a three-year developmental period (1967-72). K-14 for Controlled Experiment.

K. MATERIALS PRODUCED:
1. A deck of cards on which are recorded teaching activities classified for computer retrieval according to the objectives of the AAAS elementary science program. These are on Keysort cards organized in much the same way as the science teachers' adaptable curriculum (STAC) cards (see 1964 and 1965 versions of AAAS Clearinghouse Report).
2. Behavioral check list for teachers: To record pupil's successes with various science tasks.
3. Lists of community resources.

L. MATERIALS AVAILABLE FREE: Sample cybex reproduced by the computer. Description of the TAG program, Portland Public Schools, 631 N. E. Clackamas Street, Portland, Oregon 97208, Educational Research Department.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Undetermined.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 14 elementary.
2. Number of students involved: 2,500.
3. Number of schools involved: 4.
4. Total number of teachers using any of the materials: Not answered.
5. Total number of students using any of the materials: Not answered.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Not answered.
7. Name and location of selected schools where the course is being taught: Rice Elementary School, Wilcox Elementary School, Franklin High School and Adams High School, Portland, Oregon.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Curriculum consultants help with supplies, feedback on cybexes, evaluation of lessons, and writing new cybexes.
2. Activities conducted for pre-service and in-service teacher training: Project workshops during the summer, and

in-service classes for in-service credit.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Not answered.

S. PROJECT EVALUATION: Evaluation has been done by Portland Public Schools, Department of Research and Testing.

T. PROJECT PUBLICITY: Not answered.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: The software and the remote station being used at Rice Elementary School was made possible by a quarter of a million dollar commitment by the Louis W. and Maud Hill Family Foundation. The software for retrieval on the Scope is now stored at a much expanded facility at Portland University. The software is being developed on schedule and meeting specifications. Teachers are using the Scope and making the criticisms so necessary for a feedback type of development. Federal funds to facilitate expansion of the project have not been obtained at this time.

V. PLANS FOR THE FUTURE: Last year there was but one scope available. It is planned to double the number of scopes each year until each school has at least one. Then the push will be to have students and the community use the scopes as well as educational staff.

A. PROJECT TITLE: TECHNOLOGY FOR CHILDREN PROJECT (T4CP)

B. PROJECT DIRECTOR: Dr. Fred J. Dreves, Jr., New Jersey State Department of Education, Vocational Division, 225 West State Street, Trenton, New Jersey 08625. (609)292-5824.

C. PROJECT HEADQUARTERS:
1. Contact: Dr. Kenneth Charlesworth, Associate Director, T4CP, New Jersey State Department of Education, Division of Vocational Education, Bureau Research & Development, 225 West State Street, Trenton, New Jersey 08625
2. Special facilities or activities available for visitor viewing: Conference with Director and Associate Director; Film "Design for Learning"; Literature; Evaluation.

D. PRINCIPAL PROFESSIONAL STAFF: Assistant Director, Mr. Richard B. Harnack; Mr. Wesley Perusek - Research Associate in Technology; Mr. Laddie Gribick - Research Associate in Technology; Miss Mary Ann McEnroe - Research Associate in Technology.

E. PROJECT SUPPORT:
1. Organizational agencies: State Advisory Board, New Jersey Association of Businessmen.
2. Funding agencies: Ford Foundation, State Department of Education.

F. PROJECT HISTORY:
1. Principal originators: Miss Elizabeth Hunt, revised and restructured by Dr. Fred J. Dreves, Jr.
2. Date and place of Initiation: 1965; Vocational Division, New Jersey State Department of Education.
3. Overall project purpose: Enhance the learning through a relevant curriculum employing a "hands on" approach; providing world of work information and vocational guidance.

G. PRESENT COMMERCIAL AFFILIATIONS: New Jersey Manufacturers Association. Independent Companies: Bell Labs, Sony, Aerospace - Beltsville, Maryland.

H. PROJECT OBJECTIVES: The original overall objectives were: (1) to enhance the learning process at the elementary school level, and (2) to enlarge the child's understanding of vocational choice and to develop his economic competence in a changing world of work, through establishing a systematic program of occupational education throughout grades K-12. While these objectives have not changed in essence, they have been made more specific. It was intended that they were to be accomplished simultaneously by providing alternative curricular experiences or options of technological nature.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Discussion groups, Computer assisted instruction.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Social studies, science, math, language arts; grades K - 6; all ability levels.

K. MATERIALS PRODUCED:
1. Titles for Technology: An Annotated Bibliography.
2. Anecdotal Abstracts from an Environment for Learning.
3. Recommended Procedures for Safety and Use of Hand Tools in the Elementary Classroom.
4. A sample Curriculum Episode.
5. A sample "T4CP Happenings".
6. Monograph -- Technology for Children.
7. Design for Learning -- Film Narration.
8. Technology for Children -- Brochure.
9. Beliefs -- Technology for Children.

L. MATERIALS AVAILABLE FREE: Items 5 - 9, from project headquarters.

M. MATERIALS PURCHASABLE: Item 1, $1.50; Item 2, $1.00; item 3, $0.25; item 4, $0.25. From project headquarters.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Teacher's Manual, Additional Episodes.

Q. PROJECT IMPLEMENTATION:
1. Number of teachers who have adopted the entire course: 120.
2. Number of students involved: 3,240.
3. Number of schools involved: 73.
4. Total number of teachers using any of the materials: 110 (Approximate).
5. Total number of students using any of the materials: Materials designed for teachers. Teachers purchase materials for students.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Definitive.
7. Name and location of selected schools where the course is being taught: Undetermined at present - probably in the Trenton area.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Staffed resource center in Florence, New Jersey; State Department representative "on call".

2. Activities conducted for pre-service and in-service teacher training: Three in-service workshops; four summer institutes; 1 conference (Non-training), were financed by State Department of Education (New Jersey).

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: We train elementary educators who operate in a self contained classroom not departmentalized instructors.

S. PROJECT EVALUATION:

1. Has the effectiveness of your materials been evaluated? Yes, by New Jersey State Department of Education - assisted by E.T.S.

2. Pertinent published research studies: None.

3. Brief abstract of in-house or unpublished research: Not available at this time. Kindly contact at a later date.

4. Additional evaluative data available to interested individuals: See statement 3 above.

T. PROJECT PUBLICITY: Technology for Children Newsletter.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Summer Institute (1969), Workshop (1969), Testing and Evaluation Project (1969-70).

V. PLANS FOR THE FUTURE: National Conference. State Conferences and Workshops, including a Technology for Children course on the pre-service level.

A. PROJECT TITLE: TOTAL EDUCATION IN THE TOTAL ENVIRONMENT (TETE).

B. PROJECT DIRECTOR: William R. Eblen, TETE Project Director,
954 Ridgefield Road, Wilton, Conn. 06897. (203)762-7270.

C. PROJECT HEADQUARTERS:

1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: The materials produced; Action Models (demonstration schools that are using The Total Environment Approach to Education); Action Model Reports.

D. PRINCIPAL PROFESSIONAL STAFF: William R. Eblen, Director; John P. Daller, Asst. Director; E. Dan Cappel and Robert A. Bagg, Jr., Curriculum Specialists; George W.D. Symonds, Consultant.

E. PROJECT SUPPORT:

1. Organizational agencies: Wilton Public Schools; The Pinchot Institute for Conservation Studies; Project SPRED (Fairfield County Title III).
2. Funding agencies: Connecticut State Department of Education; The Calvin K. Kazanjian Economics Foundation; Regional Title III's; Local Boards of Education.

F. PROJECT HISTORY:

1. Principal originator: William R. Eblen.
2. Date and place of Initiation: August 1964; Wilton, Conn.
3. Overall project purpose: To increase the understanding and use of a Total Environment Approach to Education.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Fundamental objective: to enable more people to develop an appreciation of their interdependence with their total environment and responsibility for the development of a culture that maintains that environment in a condition fit for living. In order to accomplish this goal it appears necessary to:

1. Involve as many groups as possible in the community with the Total Environment Approach to Education.
2. Reorient the school curriculum by using unifying concepts that contribute to an understanding of the ecology of man.
3. Base this redirection of curricula on a model of the human ecosystem that emphasizes the interaction between the natural and cultural resources found in every community.
4. Recognize the contribution that each subject makes to understanding the ecology of man.
5. Capitalize on the unique strengths that exist within each subject in this interdisciplinary approach to problem solving.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Seminars, Discussion groups.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: The Ecology of Man, interdisciplinary (emphasis on natural sciences, social sciences, mathematics); kindergarten - college (primary, intermediate, secondary, adult).

K. MATERIALS PRODUCED:

1. Action Model Report.
2. Workbook for Outdoor and Indoor Laboratory Experiences.
3. Teachers Manual.
4. Equipment Instruction Guide.
5. Transparencies Series.
6. Teaching Tapes.

L. MATERIALS AVAILABLE FREE: Item 1 available from Project Headquarters.

M. MATERIALS PURCHASABLE: None yet.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None yet.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. Natural Ecology Kit Series.
2. Urban Ecology Kit Series.
3. State Transparency Series.
4. TETE Audio Tape Series.
5. TETE Single Concept Film Loop Series.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Not applicable (this is an approach-not a course).
2. Number of students involved: Approximately 5,000.
3. Number of schools involved: 15.
4. Total number of teachers using any of the materials: Approximately 161.
5. Total number of students using any of the materials: Approximately 5,000.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: The River Bank School, Stamford, Conn.; The Miller School, Comstock School, Junior and Senior High Schools in Wilton, Conn.; Fox Lane Middle School, Bedford, New York.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials:

    (a) Survey and assessment of the educational resources in your school and community;

    (b) Introduction of the interdisciplinary concept of learning through panel discussions, workshops, and multi-level (administrator, teacher, student) planning seminars;

    (c) Consultation and assistance in curriculum development;

    (d) Assistance in establishing indoor and outdoor total learning laboratories.

2. Activities conducted for pre-service and in-service teacher training: Pre-service and in-service teacher training available. Details supplied upon request.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Pre-service and in-service teaching materials available. Details supplied upon request.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.

2. Pertinent published research studies: None published.

3. Brief abstract of in-house or unpublished research: Constant revision on curriculum materials based on five-year teacher feedback. Attitude inventories used to measure teacher attitude shifts (pre and post measurements). Detailed computer-based study planned for statewide application of program this year.

4. Additional evaluative data available to interested individuals: Project SOLVE, New Hampshire Department of Education, has summation data on teacher attitude shifts during summer in-service workshop. Teacher evaluations and computer-based study plans are available from The Center for Interdisciplinary Creativity at Southern Connecticut State College and/or Project TETE Headquarters.

T. PROJECT PUBLICITY:

1. "Using The Total Urban Environment", The Science Teacher, Vol. 36, No. 9, December 1969.

2. "Total Education in the Total Environment", Elementary Curriculum Letter, Croft Educational Services, Vol. 7, No. 1, September 1967.

3. "The Total Environment Approach to Education", Elementary Curriculum Letter, Croft Educational Services, February 1970.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE:

A series of two-day regional workshops throughout the U.S. starting in May 1970, will be conducted for administrators and curriculum specialists. Date and places will be announced.

A. PROJECT TITLE: UNIFIED SCIENCE - A 3 YEAR APPROACH.

B. PROJECT DIRECTOR: Leonard C. Blessing, Science Department Head, Millburn Senior High, 462 Millburn Avenue, Millburn, New Jersey 07041. (201)376-3600, Ext. 248.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Classes in action.

D. PRINCIPAL PROFESSIONAL STAFF: Leonard C. Blessing, Science Dept. Head; James H. Gardner, Teacher; John Weir, Teacher.

E. PROJECT SUPPORT:
1. Organizational agency: None.
2. Funding agency: None.

F. PROJECT HISTORY:
1. Principal originators: Leonard C. Blessing, James H. Gardner, John Weir.
2. Date and place of Initiation: September, 1962; Millburn Senior High School.
3. Overall project purpose: To teach science as an interrelated theme and not as individual disciplines.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Not answered.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Laboratory investigations, Lectures.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: 10, 11, and 12th grades. All ability levels.

K. MATERIALS PRODUCED:
1. Course purpose and outline - First Year.
2. Course purpose and outline - Second and Third Year.
3. A Three Year Plan (summary of above two papers).
4. Some Problems in a Unified Science Program.

L. MATERIALS AVAILABLE FREE: None.

M. MATERIALS PURCHASABLE: Items 1 - 4 for $1.00 (all four). From: Project director.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Revisions of items listed in K.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: None in other schools, but ours has been a model for several studies.
2. Number of students involved: 100.
3. Number of schools involved: One.
4. Total number of teachers using any of the materials: About 300 copies of material have been sent out.
5. Are the totals stated in 1, 2, 3 and 4 estimated or definitive? Items 2 and 3 are definitive.
6. Name and location of selected schools where the course is being taught: Millburn Senior High School.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Contact director.
2. Activities conducted for pre-service and in-service teacher training: We have been host to the Third Annual FUSE (Federation of Unified Science Educators) Conference in Dec. 1968. We have held conferences at Millburn High School for those interested. No financing.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:

1. Has the effectiveness of the material been evaluated? We are in the midst of an analysis.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: There are four in-house reports explaining the purpose, history and organization of the Unified Science Program. The final paper deals with problems that develop in a program.
4. Additional evaluative data available to interested individuals: An evaluation will be completed in September 1970 and will be available from the director.

T. PROJECT PUBLICITY: None.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not previously reported.

V. PLANS FOR THE FUTURE: Not answered.

A. PROJECT TITLE: UNIVERSITY OF ILLINOIS ARITHMETIC PROJECT (AT EDUCATION DEVELOPMENT CENTER).

B. PROJECT DIRECTOR: Prof. David A. Page, Department of Mathematics, University of Illinois at Chicago Circle, Box 4348, Chicago, Illinois 60680.

C. PROJECT HEADQUARTERS:

1. Contact: Mr. Jack Churchill, Associate Director, University of Illinois Arithmetic Project, 55 Chapel Street, Newton, Massachusetts 02160. (617)969-7100.
2. Special facilities or activities available for visitor viewing: Visitors are welcome to inspect written materials of the course and to view one or more of the course films by appointment.

D. PRINCIPAL PROFESSIONAL STAFF: Jack Churchill, Associate Director and Editor.

E. PROJECT SUPPORT:

1. Organizational agencies: University of Illinois; Education Development Center.
2. Funding agencies: National Science Foundation; Education Development Center; Ford Foundation; Carnegie Corporation.

F. PROJECT HISTORY:

1. Principal originators: David A. Page and Jack Churchill.
2. Date and place of Initiation: 1958; University of Illinois, Urbana.
3. Overall project purpose: See Section H.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: The central theme of the project is that the study of mathematics should be an adventure, requiring and deserving hard work. Children who grasp some of the inherent fascination of real mathematics while they are in elementary school are well on the way to success in further study of mathematics and science. Students who are not to continue a formal study of mathematics deserve a taste of the subject that is at least as appealing. The project is not attempting to develop a systematic curriculum for any grade level, in the view that determining an adequate curriculum is not possible until more alternatives exist to choose among. What is needed are frameworks that provide day-to-day, "here-is-something-to-try" ideas for the classroom. The emphasis is on things that the teacher can begin working with soon. The term "new mathematics" is avoided by the project. More properly, the project seeks novel ways of doing old mathematics - new structure or schemes within which can be found large numbers of interrelated problems revealing significant mathematical ideas. Teachers participating in an institute work a number of sequences of such problems each week to become acquainted with the mathematics, and then begin to make up and try out their own sequences. Throughout its work, the project has found that improved computational skills usually follow work with its materials. Children will do impressive amounts of computation in order to solve problems that interest them.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Seminars, Discussion groups. The course for teachers is based on written lessons, films of classes, discussions, careful correcting of written work with attention to sources of errors, and the inventing and adapting by participating teachers of new materials for classes.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Mathematics, grades kindergarten through six; in-service and pre-service elementary teachers.

K. MATERIALS PRODUCED:

1. General Information.
2. Ways to Find How Many.
3. Maneuvers on Lattices.
4. Well-Adjusted Trapezoids.
5. Number Lines for the Orbiting Atomic Teacher.
6. Do Something About Estimation.
7. Teaching Creativity in Mathematics.
8. Arithmetic With Frames.
9. Functions.
10. A Sample and Description of Course I.
11. Book: Number Lines, Functions, and Fundamental Topics.

Materials Comprising the University of Illinois Arithmetic Project Course for Elementary School Teachers.
Written Lessons

12. Introduction to Frames and Number Line Jumping Rules.
13. Consecutive Jumps. Distances Jumped. Competing Number Line Jumping Rules.
14. Parentheses and "Multiplying Before You Add". Standstill Points.
15. Effects of Using Rules in Different Orders.
16. Introduction to Maneuvers on Lattices.
17. Frame Equations. Midpoints. Rules Moving Two Points.
18. Rules Moving Two Points, Continued. Composition of Number Line Rules.
19. Composition, Continued.
20. Some Wrong Answers. Composing Number Line Rules to Move Two Points to Two Points.
21. Artificial Operations.
22. More Work With Artificial Operations.
23. Maneuvers on Lattices, Continued.
24. More Work With Competing Rules. Lower Brackets.

25. Lower Brackets and Upper Brackets.
26. Graphing Equations With Lower and Upper Brackets.
27. Simultaneous Equations. Points and Lines in a Plane.
28. Number Plane Jumping Rules.
29. Number Plane Rules, Continued.

Films

30. *A First Class With Number Line Rules and Lower Brackets* (Lee Osburn, Grade 5).
31. *Which Rule Wins?* (Phyllis R. Klein, Grade 3).
32. *Standstill Points* (David A. Page, Grade 5).
33. *Three A's, Three B's, and One C* (David A. Page, Grade 5).
34. *A Seven-Fold Lattice* (Francis X. Corcoran, Grade 5).
35. *Frames and Number Line Jumping Rules* (Lee Osburn, Grade 5).
36. *Rules Moving Two Points* (David A. Page, Grade 5).
37. *Introduction to Composition* (Marie L. Hermann, Grade 5).
38. *Surface Area With Blocks* (Phyllis R. Klein, Grade 1).
39. *Some Artificial Operations* (Phyllis R. Klein, Grade 4).
40. *Counting With Dots* (David A. Page, Grade 2).
41. *A Periodic Lattice* (Phyllis R. Klein, Grade 5).
42. *Lower and Upper Brackets* (Carol Daniel, Grade 4).
43. *Inequalities With Lower Brackets* (Francis X. Corcoran, Grade 5).
44. *Graphing With Square Brackets* (David A. Page, Grade 5).
45. *Graphing Absolute Value Equations* (Marie L. Hermann, Grade 2).
46. *Jumping Rules in the Plane, Part I* (Lee Osburn, Grade 6).
47. *Jumping Rules in the Plane, Part II* (Lee Osburn, Grade 6).
48. *Rotations in the Plane* (David A. Page, Grade 5).

Supplements

49. Answers to Common Questions About the Institute.
50. Computing With Positive and Negative Numbers.
51. Answers to Questions About the Film "Standstill Points".
52. Dividing By Zero.
53. Maneuvers on Lattices.
54. Arithmetic With Frames.
55. Functions.
56. Using Blocks to Introduce Other Bases of Numeration to a Fourth Grade.
57. "Surrounding" With Centimeter Blocks.
58. Well-Adjusted Trapezoids.
59. Ways to Find How Many.
60. More Suggestions for Lattices.
61. Using Centimeter Blocks to Introduce Prime Numbers to a Third Grade.
62. Graphing Number Line Jumping Rules.
63. More Problems With Composition of Number Line Rules.
64. Graphing Simultaneous Equations.
65. Examples of Questions Dealing With $\blacksquare \rightarrow \blacksquare \times \blacksquare$

66. More Work With Number Plane Rules.
67. Hybrid Rules: Jumping Rules From the Line to the Plane and From the Plane to the Line.
68. Bibliography.

69. Discussion Notes (for each written lesson and film).
70. Corrector's Guides (for each written lesson)

L. MATERIALS AVAILABLE FREE: Items 1 - 10 are free in small quantities from EDC (see address in item "C").

M. MATERIALS PURCHASABLE: Items 2 and 3, $0.20 each in quantities larger than 10, available from Education Development Center. Item 11, $3.80 (deduct 20% discount on orders from schools), available from the Macmillan Company, 866 Third Avenue, New York, New York 10022. Information on the cost of course materials is available from EDC.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Undetermined.

P. ADDITIONAL MATERIALS BEING DEVELOPED: None.

Q. PROJECT IMPLEMENTATION:

1. Number of teachers who have adopted the entire course: Over 1200 teachers have taken the course in the last two years.
2. Number of students involved: Not known.
3. Number of schools involved: Approximately 40.
4. Total number of teachers using any of the materials: Not known.
5. Total number of students using any of the materials: Not known.
6. Are the totals stated in 1, 2, 3, 4 and 5 estimated or definitive? Estimated.
7. Name and location of selected schools where the course is being taught: The locations in which the course has been given since 1968 are listed below. The average number of participants enrolled in these institutes was thirty.

EDC Resource Center, Roxbury, Massachusetts (In-service).
The Choir School of St. Thomas Church, New York, New York (In-service).
Western Montana College, Dillon, Montana (Pre-service).
Chadron State College, Chadron, Nebraska (In-service).
Corinth District Schools, Prairie Village, Kansas (In-service).
State University College, Geneseo, New York (Two pre-service institutes).
University of Hawaii, Honolulu, Hawaii (Two in-service institutes).
EDC Innovation Team, Washington, D.C. (In-service).

Fairfax County Public Schools, Bailey's Crossroads, Virginia (In-service).
Anchorage Borough School District, Anchorage, Alaska (Two in-service institutes).
Somersworth School District, Somersworth, New Hampshire (In-service).
Clark University, Worcester, Massachusetts (Pre-service).
University of Illinois, Champaign, Illinois (Pre-service).
Park School, Brookline, Massachusetts (In-service).
Burlington Public Schools, Burlington, Massachusetts (In-service).
Marywood College, Scranton, Pennsylvania (Pre-service).
University of Virginia, Falls Church, Virginia (Pre-service).
Auburn Public Schools, Auburn, Massachusetts (In-service).

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Upon request the project can make available names of former project staff members who might be available as consultants.

2. Activities conducted for pre-service and in-service teacher training: The project no longer conducts institutes; the course materials are designed to be fully effective without specially trained instructors. (See No. 3 below)

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: The project's principal activity has been to produce pre-service and in-service materials which are contained in the course described here. Costs will be determined by the publisher of the materials when one is selected. For costs during the interim distribution period write to: University of Illinois Arithmetic Project, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160.

S. PROJECT EVALUATION: Effectiveness of the materials has been evaluated by the project staff.

T. PROJECT PUBLICITY:
NCTM Bulletin for Leaders, Sept. 1968.
Arithmetic Teacher, Nov. 1968.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Completion of course described above. Arrangements made for interim distribution of course materials through Education Development Center, Newton, Massachusetts.

V. PLANS FOR THE FUTURE: The project has concluded its major course-production activity at EDC.

A. PROJECT TITLE: UNIVERSITY OF ILLINOIS COMMITTEE ON SCHOOL MATHEMATICS (UICSM).

B. PROJECT DIRECTOR: Professor Max Beberman, 1210 West Springfield, Urbana, Illinois 61801. (217)333-0150.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: University High school, a secondary school devoted to curriculum development. Washington Elementary School, a public elementary school open to curriculum researchers from the University of Illinois.

D. PRINCIPAL PROFESSIONAL STAFF: Max Beberman, Director; William Golden, Assistant to the Director; Herbert E. Vaughn, Mathematician; Steven Szabo, Writer; Russell Zwoyer, Writer; L. Roland Genise, Writer.

E. PROJECT SUPPORT:
1. Organizational agency: University of Illinois.
2. Funding agencies: Carnegie Coporation of New York (until June 1962); U.S. Office of Education (until December 1964); National Science Foundation (1962 -).

F. PROJECT HISTORY:
1. Principal originators: College of Education, Engineering, and Liberal Arts and Sciences of the University of Illinois.
2. Date and place of Initiation: December 1951; University of Illinois.
3. Overall project purpose: Dissatisfaction with the mathematics preparation of incoming freshmen at the University of Illinois and the desire to guide high schools in improving their mathematics offerings.

G. PRESENT COMMERCIAL AFFILIATIONS: Some texts produced by the UICSM are published by D.C. Heath and Co.; films produced by the UICSM are distributed by Modern Learning Aids, Inc.; 7th and 8th grade texts are distributed by Harper and Row, Inc.; vector geometry to be distributed by Macmillan Co.

H. PROJECT OBJECTIVES: Until 1962 the UICSM devoted its efforts to producing a highly self-consistent and inter-related series of texts for college bound students in grades 9-12. These texts are unusual in that they embody "discovery method" pedagogy; they were the first to introduce a strong deductive thread to the teaching of elementary algebra; and they introduce and use principles of logic and a level of precision in language which is not common to high school texts. Since 1962, our major curriculum development effort has been the development of unusual approaches to topics in junior high school mathematics appropriate for culturally disadvantaged students in large urban school systems. Most recently, our emphasis has been on teacher training to equip teachers to use UICSM products.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Independent study, Programmed instruction, Laboratory investigations, Computer assisted instruction.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: The UICSM program for senior grades 9-12: algebra, plane Euclidean geometry, advanced algebra, and circular functions, with appendices on solid geometry, logic, and other topics; the UICSM vector geometry course; a two-year sequence in three-dimensional Euclidean geometry, linear algebra, and trigonometry with a vectorial approach--for able students in senior high school; the UICSM 7th grade materials: the arithmetic of common fractions, decimals and percents using unconventional models and heavy reliance on pictures -- for culturally disadvantaged junior high school students with low achievement in mathematics; the UICSM 8th grade materials: plane geometry approached through motions in the plane. Elementary school mathematics and science.

K. MATERIALS PRODUCED:
1. UICSM High School Mathematics; Units 1-11 (including teachers commentaries).
2. Examinations for Units 1-6.
3. Teacher-training films-demonstrations of a class studying the UICSM 9th grade course.
4. Self-instructional texts on solid geometry, logic, introduction to algebra.
5. 7th and 8th grade materials for underachievers.

L. MATERIALS AVAILABLE FREE: None available from item listings above. Reprints of articles written by staff available upon request.

M. MATERIALS PURCHASABLE:
1. UICSM High School Mathematics Course 1 (revised Units 1-4) - student edition, $5.60; teachers edition, $7.96.
UICSM High School Mathematics Course 2 (revised Units 6 9) - student edition, $6.60; teachers edition $7.96.
UICSM High School Mathematics Course 3 (revised Units 5, 6, 8, 9) - student edition $6.68; teachers edition $7.96.
2. No longer available.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Spanish and French.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Not answered.

Q. PROJECT IMPLEMENTATION: Unknown because distribution is in hands of commercial firms.

1. Name and location of selected schools where the course is being taught: Schools using 7th and 8th grade materials: Pasack Valley Regional High School, Hillsdale, New Jersey; Boulder City High School, Boulder City, Nevada; Marina Del Rey Junior High School, Los Angeles, Calif.; Weston Middle School, Weston, Connecticut; Greenwood School, Greenwood, Delaware; Kaimuki Intermediate, Honolulu, Hawaii; 16th Street Junior High School, St. Petersburg, Florida; Beckman Junior High School, Gary, Indiana; Esperanza Middle School, Lexington Park, Maryland; Meadowbrook Junior High School, Newton Centre, Massachusetts; Roosevelt Junior High School, Cleveland Hts., Ohio; Ben Dunman Junior High School, Mullens, West Virginia.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: UICSM staff often visits users.
2. Activities conducted for pre-service and in-service teacher training: Numerous summer institutes at University of Illinois and elsewhere. NSF-CCSP cooperative projects place trained consultants in specified school districts. UICSM will also train college personnel who wish to offer in-service instruction.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: A video-tape series for 7th and 8th grade is in preparation. A film series for 9th grade algebra is available at usual film rental costs.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff and City Schools of Philadelphia.
2. Pertinent published research studies: None.
3. Brief abstract of in-house or unpublished research: None.
4. Additional evaluative data available to interested individuals: Write to project director.

T. PROJECT PUBLICITY:

1. Max Beberman, "The Old Mathematics in the New Curriculum." Educational Leadership, March 1962.
2. Max Beberman, "Searching for Patterns", a paper prepared for OECD International Working Session on New Methods in the Teaching of Mathematics. Athens, Greece, November 1963.
3. Max Beberman, "UICSM--Fifteen Years of Experimentation." Illinois Journal of Education, January 1967.
4. Max Beberman and Alice G. Hart, "New Approach to Mathematics." Discovery, March 1962.
5. Peter Braunfeld, Clyde Dilley, and Walter Rucker, "A New UICSM Approach to Fractions for the Junior High School", The Mathematics Teacher, March 1967.

6. Peter Braunfeld and Martin Wolfe, "Fractions for Low Achievers", The Arithmetic Teacher. December 1966.

7. O. Robert Brown, Jr., "Using a Programmed Text to Provide an Efficient and Thorough Treatment of Solid Geometry Under Flexible Classroom Procedures", The Mathematics Teacher. May 1967.

8. J.A. Easley, Jr., "The Natural Sciences and Educational Research -- A Comparison", The High School Journal, Vol. 50, No. 1, October 1966.

9. William Golden, "UICSM in its Second Decade", Journal of Research in Science Teaching", Vol. 1, 1963.

10. William T. Hale, "UICSM's Decade of Experimentation", The Mathematics Teacher, December 1961.

11. Gertrude Hendrix, "Learning by Discovery", The Mathematics Teacher, May 1961.

12. Walter J. Sanders and J. Richard Dennis, "Congruence Geometry for Junior High School", The Mathematics Teacher, April 1968.

13. Steven Szabo, "Current Activities of UICSM", Journal of Research in Science Teaching, Vol. 2, 1964.

14. Steven Szabo, "An Approach to Euclidean Geometry Through Vectors", The Mathematics Teacher, Vol. LIX, No. 3, March 1966.

15. Steven Szabo, "Some Remarks on Discovery", The Mathematics Teacher, December 1967.

16. Steven Szabo, "Several Ways of Translating a Conditional Sentence: A Dialogue", The Mathematics Teacher, Volume LXI, No. 1, January 1968.

17. UICSM Staff, "Words, 'Words', "Words" ", The Mathematics Teacher, March 1957.

18. UICSM Staff, "Arithmetic With Frames", The Arithmetic Teacher, April 1957.

19. UICSM Staff, "A Description of UICSM Materials for Self-Instruction -- Annotated Samples Illustrating Content and Pedagogy", 146pp. Published by UICSM, February 1963.

20. Herbert E. Vaughn, "An Illustration of the Use of Vector Methods in Geometry", The Mathematics Teacher, Vol. LVIII, No. 8, December 1965.

21. Martin S. Wolfe, "The UICSM Program, Old and New", Euclides, 41st volume, 1965/1966, Utrecht, Netherlands.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:

Contacted several hundred college math-educators with the intent of training some of them to do in-service instruction for our materials for underachieving junior high students.

V. PLANS FOR THE FUTURE:

1. Complete college course of logic and proof.
2. Start 9th grade alternate to algebra for academically oriented students who do not expect to follow a scientific career.
3. Devise a computer assisted high school course in probability and statistics.

SYNOPSES

The following are brief descriptions of American projects. Some of them are well-established and have been described completely in earlier issues of The Clearinghouse Report; others are new and not yet fully established:

1. ACCELERATED INSTRUCTION PROJECT OF THE CALIFORNIA MATHEMATICS IMPROVEMENT PROGRAMS.
   CONTACT: Mrs. Bryne Bessie Frank, Consultant in Mathematics, State Department of Education, 721 Capitol Mall, Room 444, Sacramento, California 95814. Tel. (916) 445-5361.

This program is aimed at the mathematically talented pupils in grades 8-12. The State Department of Education assists high schools in making and financing contractual arrangements with colleges to assist them in initiating or improving accelerated instructional programs. The goal is to receive advanced placement in college for the twelfth-grade calculus course.

2. ANNOTATED BIBLIOGRAPHY OF EXPERIMENTAL SCIENCE PROJECTS.
   CONTACT: Dr. James R. Wailes, School of Education, University of Colorado, Boulder, Colorado 80302.

Dr. Wailes has prepared a revised edition of previous bibliographies. In it, he describes most of the major science projects, giving a description of their intent and of the materials produced. Copies of this bibliography are available free on request.

3. ANTHROPOLOGY CURRICULUM PROJECT.
   CONTACT: Dr. Marion J. Rice, Project Coordinator and Co-Director, Anthropology Curriculum Project, University of Georgia, Athens, Georgia 30601.

This project produces materials for the elementary and junior high school student in the area of anthropology. The materials deliberately introduce anthropological terminology in order to help him organize and interpret in a more meaningful manner the world in which he lives. Topics covered are: culture, archeological methods, life cycles, political anthropology, language and several others. Contact director for a descriptive brochure including prices.

4. BI-STATE PROJECT FOR THE IMPROVEMENT OF IN-SERVICE TEACHER EDUCATION THROUGH SCIENCE.
   CONTACT: Dr. John R. Shinpoch, Director, Bi-State Science Project, Library Learning Center, Tarkio, Missouri 64491. Tel. (816) 736-4131.

This project is designed to aid school systems with the implementation of modern science programs for the elementary school. Activities are aimed at developing and demonstrating an in-service program to improve teacher attitudes toward science teaching, procedures for the improvement of local science programs and an in-service program to increase teacher's knowledge and skills in science. The project uses microteaching, programmed instruction, and a variety of multi-media approaches during the summer activities.

5. CENTER FOR RESEARCH IN COLLEGE INSTRUCTION OF SCIENCE AND MATHEMATICS (CRICISAM). *

CONTACT: Dr. Guenter Schwarz, CRICISAM, 212 Diffenbaugh,
Florida State University, Tallahassee, Florida 32306.
Tel. 904-559-4166.

The goals of the Center are "To provide a Center for the investigation, development, and dissemination of new materials and techniques of collegiate instruction in the various fields of science and mathematics with emphasis on interdisciplinary cooperation. This Center will provide an agency for bringing the creative efforts of the entire scientific community to the service of curriculum and course development. The undivided attention of individuals for limited periods would be devoted to research on collegiate instruction in science and mathematics."

These were the words of the Interim Organizing Committee describing the goals of the Center. Since then, a number of projects have been initiated, and a broadening of the goals has been achieved.

To the best of the staff's knowledge, this is the first and only inter-university and inter-state regional "Science Teaching Center". In spite of the financial straightjacket which has been put on the operations due to the general funding crisis it is felt that the Center can serve a unique purpose and do it well. Already, several projects have been originated as a result of CRICISAM either at the location of the CRICISAM office or in other locations, which promise to have real impact on curriculum and/or dissemination and/or improvement of instruction in colleges which need help desperately.

The Center has been producing single-concept film loops, new laboratory experiments and has experimented with computer-assisted instruction in mathematics. Plans for the future include developing a physical chemistry laboratory. A list of films produced, prototypes of experiments and a brochure describing their activities is available free from the project director.

*Reprinted from 1968 Report at request of director.

6. LIBERAL-ARTS COMPUTER INSTRUCTION.

CONTACT: Dr. Robert Hart, Assistant Professor of Physics,
New College and Physics Department, Hofstra University,
Hempstead, New York 11550. Tel. (516) 560-3462.

The purpose of this project is to give large numbers of liberal arts students literacy about computers, stressing hands-on computer operation and programming, cheapness, feasibility, practicality, and mass applicability. The director is making available a "do-it-yourself" package which makes it possible for any professor to insert this instruction into his course, by using a visiting lecturer. The time required is three hours of lecture and two at the computer. Plans are being made to film the lecture materials and write a text booklet so that the program will be "canned" for independent use.

7. COMMISSION ON ENGINEERING EDUCATION.
CONTACT: Dr. Newman Hall, Commission on Engineering Education of the National Academy of Engineering, 2101 Constitution Avenue, Washington, D.C. 20418.

The Commission on Engineering Education has become an integral part of the National Academy of Engineering. In its new setting, it will concern itself with aspects of engineering education in a broader range than that of the old Commission. Contact the director for further details on these new activities.

8. CONSERVATION CURRICULUM IMPROVEMENT PROJECT.
CONTACT: Albert H. H. Dorsey, Chief Supervisor, Curriculum Development Section, South Carolina State Department of Education, Room 801, Rutledge Building, Columbia, South Carolina 29201.

This project has developed "teacher guides" for conservation education with the following objectives: 1. to develop guides for integrating conservation education into the total school program; 2. to provide background knowledge and to elucidate the principles of teaching conservation for the inexperienced teacher; 3. to provide interdisciplinary materials for the teaching of conservation in a variety of contexts; and 4. to develop a cooperative program for schools and other interested groups to establish better conservation practices. The guides range from elementary through high school in a variety of disciplines.

9. CONTINUOUS CURRICULUM DEVELOPMENT - RURAL SCHOOL.
CONTACT: John Andrews, R. 4, Box 224, Goshen, Indiana 46526.
Tel. (219) 831-2188.

This project attempts to develop continuously the curriculum for a K-12 rural school. Team teaching and modular scheduling are used in the high school and departmentalized teaching in grades 4, 5, and 6. The newly developed K-12 curriculum for each discipline is continuously revised in the light of student experience.

10. DEVELOPMENT OF A SELF-STUDY PHYSICS PROGRAM IN A MULTI-DISCIPLINARY BASIC SCIENCE COURSE FOR PHYSICS MAJORS.
CONTACT: Philip R. Pennington, Assistant Professor of Physics, Portland State University, P.O. Box 751, Portland, Oregon 97207. Tel. (503) 226-7271 Ext. 1472.

This project is charged with the development of study units suitable for use in problem-oriented, multi-disciplinary college science teaching. The units include self-pacing, mastery, and personal interaction, as proposed by Fred S. Keller, (Journal of Applied Behavioral Analysis, 1, 19, 1968). A report describing the Keller approach is available from Dr. Pennington.

11. ELEMENTARY SCHOOL SCIENCE PROJECT (UNIVERSITY OF ILLINOIS ASTRONOMY PROGRAM).
CONTACT: Dr. J. Myron Atkin, Professor of Science Education, University of Illinois at Champaign-Urbana, Urbana, Illinois 61801.

The purpose of this project, which became inactive in 1968, was to identify concepts that astronomers consider to be fundamental and then to prepare instructional materials emphasizing those concepts while highlighting the rational basis for our knowledge. A major purpose of the project was to help children understand how scientists have arrived at the knowledge they use. Thus, processes associated with science are emphasized to support the major conceptual themes. The project produced six student booklets and teacher guides for us in grades five through nine. They are published by Harper and Row.

12. ENVIRONMENTAL STUDIES INSTITUTE.
CONTACT: Dr. James R. Manwaring, Exec. Dir., Environmental Studies Institute, 1117 East Genesee Street, Syracuse, New York 13210. Tel. (315) 476-5541.

This institute is a multi-disciplinary body concerned with the study of environmental quality and the problems of pollution. They produce instructional programs, serve as an instructional resources center and do research and evaluation of existing programs. Their primary mission is to develop meaningful experiences for educational programs in the fields of environmental quality, human ecology and land, water and air pollution. These will be available for students from elementary school through college.

13. ESTABLISHMENT OF A MODEL REGIONAL COMPUTER CENTER USING TIME SHARING.
CONTACT: Dr. Thomas E. Kurtz, Director, Kiewit Computation Center, Dartmouth College, Hanover, New Hampshire 03755. Tel. (603) 646-2643.

This project was created to determine the feasibility of time sharing as a means of meeting computing needs at the college level; to determine the basis on which a permanent consortium would be organized and financed; and to develop a proposal for such a consortium.

14. GEOGRAPHY CURRICULUM PROJECT.
CONTACT: Dr. Marion J. Rice, Geography Curriculum Project, University of Georgia, Margaret Hall, Athens, Georgia 3060.

The preparation of curriculum materials by the Geography Curriculum Project, University of Georgia, is based on the premise that any field of knowledge, such as geography, consists of a system of concepts, or word labels, which are used to express ideas and describe relationships. An understanding of geography begins with an understanding of the concept system.

The contribution that geography can make to an understanding of man/earth relationships is frequently obscured in the elementary grades due to an absence of emphasis on geography concepts and terminology. The materials produced by the Project provide the necessary emphasis. The concept system of geography is used in the units to expand geographic knowledge. The student is also provided with simulation exercises to apply the concept system.

Units are available for the primary and middle grades; among the topics covered are: the Earth, place and environment, spatial arrangement and region, urban landscape, and population. Contact project director for a descriptive brochure.

15. IDAHO EARTH SCIENCE SERIES PUBLICATIONS.
CONTACT: Mr. Lewis Prater, Assistant Director, Idaho Bureau of Mines and Geology, Moscow, Idaho 83843.
Tel. (208) 882-4624.

The project has the overall objective of providing popular accounts of earth science phenomena in Idaho. Idaho Earth Science (1967) gives a general review of geology, climate, soils, and water of the state. Introduction to Caves and Caving (1969) is a "do-it-yourself" publication for those who are interested in exploring underdeveloped caves in Idaho. Each can be purchased for a price of $4.00 and $1.00 respectively.

16. INDIVIDUAL LECTURES FILM PROJECT OF THE MATHEMATICAL ASSOCIATION OF AMERICA.
CONTACT: Dr. Richard C. Long, Chairman, Department of Mathematics, Lawrence University, Appleton, Wisconsin 54911.
Tel. (414) 739-3681.

This project will produce films on mathematics topics outside the regular curriculum to be used with mathematics majors at the junior and senior levels of the university. The type of film to be produced is similar to the "Mathematics Today" series produced by the Mathematical Association of America and distributed by Modern Learning Aids.

17. INQUIRY OBJECTIVES IN THE TEACHING OF BIOLOGY.
CONTACT: Dr. Richard M. Bingman, Editor, Publications and Reports, Mid-continent Regional Educational Laboratory (McREL), 104 E. Independence Ave., Kansas City, Missouri 64106.

This is an endeavor to produce exemplary inquiry objectives for use by administrators, supervisors, curriculum designers, and teacher educators for activities including revision of current instructional objectives and development of evaluation instruments. A 147 page document is available which discusses the rationale and guiding principles of inquiry as well as the use of behavioral objectives to design instruction and develop evaluation instruments. These materials are primarily intended for high school biology.

18. INQUIRY ROLE APPROACH (IRA).
CONTACT: Dr. Richard M. Bingman, Director, McREL (Mid-continent Regional Education Laboratory), 104 E. Independence Avenue, Kansas City, Missouri 64106.

The purpose of this project is to develop role-differentiated small-group and individual inquiry skills in high school biology students. Role differentiation is utilized for discussion and laboratory activities of teams composed of four students each. Over 200 problem-solving guides have been produced. An IRA descriptive packet and a 25 min. color film are available from the director. Evaluation and revision of materials will continue through 1971. The student work is based on BSCS biology materials. Some dissertation research (Steiner, 1969) is available in a comparison of IRA and non-IRA classes on affective or attitudinal criteria.

19. MASSACHUSETTS - NASA AEROSPACE CURRICULUM RESOURCE GUIDE.
CONTACT: Mr. John W. Packard, 182 Tremont Street, Boston, Massachusetts 02111. Tel. (617) 727-5746.

This project has produced a resource guide to provide teachers of grades 1-12 in all subjects with activities and teaching suggestions for strengthening instruction by including topics in the aerospace field. Single copies are available free from the director.

20. MATHEMATICS SPECIALIST PROJECT OF THE CALIFORNIA MATHEMATICS IMPROVEMENT PROGRAMS.
CONTACT: Mrs. Bryne Bessie Frank, Consultant in Mathematics, State Department of Education, 721 Capitol Mall, Room 444, Sacramento, California 95814. Tel. (916) 445-5361.

This program aims at the improvement of elementary pupil achievement by using highly trained mathematics specialists to teach four class periods per week in addition to the regular class instruction conducted by the permanent teacher. Discovery methods are used in the areas of abstract algebra and coordinate geometry with students in grades 2, 3, 4 and 6.

21. PACIFIC NORTHWEST ASSOCIATION FOR COLLEGE PHYSICS (PNACP).
CONTACT: Dr. Wilbur V. Johnson, Executive Officer, PNACP,
c/o Department of Physics, Central Washington State College,
Ellensburg, Washington 98926.

The Association sponsors programs for college teachers designed to: increase communication and cooperation within the geographic area, encourage discussions of curricular problems and the consideration of new media and materials, offer instruction for updating knowledge and skills, assist in initiating research, and the development of instructional materials. The monthly newsletter and other materials are available free of charge.

22. PENNSYLVANIA EARTH AND SPACE SCIENCE PROGRAM.
CONTACT: Mr. William H. Bolles, Earth and Space Science
Education Adviser, Pennsylvania Department of Education,
Bureau of General and Academic Education, Box 911,
Harrisburg, Pennsylvania 17126.

The purpose of this project is to provide a guide to curriculum development in earth and space science and to produce related materials for teacher use. The Earth and Space Science Teaching Guide (1970 Edition) will be available in September 1970 from the director at a cost which has not yet been established. Field-trip guidebooks and accompanying filmstrips are being developed.

23. SCIENCE FOR THE SEVENTIES.
CONTACT: Dr. Irvin T. Edgar, Science Education Adviser,
Pennsylvania Department of Education, Box 911, Harrisburg,
Pennsylvania 17126. Tel. 717 787-7320.

This project has produced materials to provide direction for elementary teachers in teaching science through the provision of illustrative science materials. It provides a variety of activities and procedures to be adapted by the teacher to suit the individual classroom. The aims of this project are to develop students who are scientifically literate and who have sound problem-solving strategies. A Guide and an Activity Book are available for purchase.

24. SPACE RESOURCES FOR TEACHERS.
CONTACT: J. V. Bernardo, Director of Educational Programs,
National Aeronautics and Space Administration, Washington,
D.C. 20546. Tel. (202) 963-3125.

The purpose of this project is to provide aerospace-related publications to help update the teaching of secondary school science and mathematics. These guides are designed for use by the teacher, supervisor, curriculum committee member and textbook writer. They are resources from which the professional may select aerospace-related ideas and information for enrichment of classroom teaching. The titles which have appeared are:

1. Space Resources for Teachers: Biology, 1969.
2. Space Resources for Teachers: Space Science, 1969.

Guides for chemistry, physics and mathematics topics are under development.

25. WISCONSIN MATHEMATICS CURRICULUM PUBLICATIONS.
CONTACT: George L. Henderson, Supervisor-Mathematics,
Department of Public Instruction, 126 Langdon Street,
Madison, Wisconsin 53702.

Curriculum bulletins for Wisconsin schools are provided for grades K through six and grades six through eight. Each bulletin is organized in terms of specific student behavioral objectives. Mathematics tests are being developed based on the objectives in the curriculum guides. Sample tests for grades one through five, with statewide norms, will be published early in 1971, and tests for grades six through eight should be published by 1973.

26. WORTH CURRICULUM DEVELOPMENT CENTER AND SERVICES.
CONTACT: Brendan Foley, Coordinator, Worth Curriculum
Development Center, 12225 Crawford, Alsip, Illinois 60658.

The Center has produced a curriculum guide, "Challenges in Mathematics", which includes behavioral objectives in sequential form, test items to assess behavior acquisition, a listing of appropriate aids for teaching these objectives, and a guide for selecting mathematics textbooks. The guide is available for purchase from the director.

The College Commissions of the United States

A. NAME OF COMMISSION: COMMISSION ON COLLEGE GEOGRAPHY (CCG).

B. DIRECTOR: Dr. John F. Lounsbury, Project Director, Commission on College Geography, Department of Geography, Arizona State University, Tempe, Arizona 85281. (602)965-3471.

C. PROJECT HEADQUARTERS:
1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. John F. Lounsbury, Project Director; Dr. Salvatore J. Natoli, Associate Project Director (beginning June 1970); Mrs. Betzy M. Shaw, Project Accountant and Bookkeeper; Mrs. Beverly A. Brown, Project Secretary.

E. PROJECT SUPPORT:
1. Organizational agencies: Association of American Geographers.
2. Funding agencies: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originators: Dr. John F. Lounsbury; Arch C. Gerlach; Gilbert F. White; Saul B. Cohen.
2. Date and place of Initiation: January 1965; Association of American Geographers, 1146 16th Street, N.W., Washington, D. C. 20036.
3. Overall project purpose: Improve undergraduate college geography courses and programs.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: The major purpose of the Commission, and its active panels, is to work in various ways to improve geographic education at the college level and to make it responsive to the broader educational needs of colleges and universities throughout the nation. This necessitates continuing investigation, and the development and distribution of pertinent materials concerning the overall role that modern geography should play in college curricula, including programs of study in geography and programs of study to which geography can make significant contributions. Specifically, the major objectives of the Commission are to: 1. Develop and publish a variety of pertinent materials to facilitate the incorporation of recent developments and research in undergraduate programs; 2. Investigate ways and means to increase the effectiveness of undergraduate teaching, including the development of new instructional patterns, and techniques of presentation; 3. Develop approaches to integrate geographic education within the broader higher education context, including contacts with related disciplines and participation in interdisciplinary curriculum efforts; 4. Work with individuals and institutions in strengthening geography curricula; 5. Generate, investigate, and develop new ideas to improve geographic education in undergraduate programs.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Materials produced may be used in: Independent study, Lectures, Seminars, Discussion groups and Computer assisted instruction.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Undergraduate college courses and programs in geography.

K. MATERIALS PRODUCED:

CCG Publications:

1. Geography in Undergraduate Liberal Education.
2. A Basic Geographical Library: A Selected and Annotated Book List for American Colleges.
3. Geographical Manpower: A Report on Manpower in American Geography.
4. New Approaches in Introductory College Geography Courses.
5. Introductory Geography: Viewpoints and Themes.
6. Undergraduate Major Programs in American Geography.
7. A Survey Course: The Energy and Mass Budget at the Surface of the Earth.
8. A Systems Analytic Approach to Economic Geography.

Resource Papers:

1. Theories of Urban Location.
2. Air Pollution.
3. Perspectives on Geomorphic Processes.
4. Spatial Diffusion.
5. Perception of Environment.
6. Social Processes in the City: Race and Urban Residential Choice.
7. The Spatial Expression of Urban Growth.

Technical Papers:

1. Field Training in Geography.
2. Computer Assisted Instruction in Geography.

L. MATERIALS AVAILABLE FREE: 4, 6-17, one free copy upon request. 1-3 and 5 are presently out of print. Write to: Commission on College Geography, Geography Department, Arizona State University, Tempe, Arizona 85281.

M. MATERIALS PURCHASABLE: 4-8, 16, 17 - May be purchased for $1.00 per copy from: Association of American Geographers, 1146 16th Street, N. W., Washington, D. C. 20036.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:

1. Resource Paper No. 8 - Political Organization of Space.
2. Technical Paper No. 3 - Evaluating Geography Courses: A Model with Illustrative Applications.
3. CCG Publication No. 9 - A Revised Basic Geographical Library: A Selected and Annotated Book List for American Colleges.
4. CCG Publication No. 10 - Geography and the Two-Year Colleges.

Q. PROJECT IMPLEMENTATION: Although we have no definite data, the Commission's publications appear to be widely used at colleges and universities in this country and abroad.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: At the present time, there is informal consultant service by members of the Commission upon request. It is planned to establish a formal consulting bureau during the spring and summer of 1970.
2. Activities conducted for pre-service and in-service teacher training: Summer Institutes for College Teachers of Geography during the 1965-1970 period, developed jointly by the Commission and selected universities, are supported by NSF or Office of Education.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: All publications listed in K, would be appropriate.

S. PROJECT EVALUATION: Being planned internally for 1970.

T. PROJECT PUBLICITY: Lounsbury, John F.: "College Geography in the United States" The Journal of Geography, Vol. LXVII, No. 5, May, 1968.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Since the 1968 report, the Commission and its working panels have developed, published, and distributed the following documents:

Regular Series: The regular series of publications are designed for widespread use by instructors of college geography courses and related fields. The documents that have been published since the 1968 report are:

CCG Publication No. 6,	Undergraduate Major Programs in American Geography.
CCG Publication No. 7,	A Survey Course: The Energy and Mass Budget at the Surface of the Earth.
CCG Publication No. 8,	A Systems Analytic Approach to Economic Geography.

Resource Papers: The Resource Papers are designed for student use as well as the instructor. The topics of these documents are concerned with important subject matter which is not normally included in current introductory texts nor readily accessible in current literature. These papers translate recent research developments and conceptual ideas into documents from which instructors of beginning courses can select to supplement existing text material. The Resource Papers published since the 1968 report are:

Resource Paper No. 1, Theories of Urban Location.
Resource Paper No. 2, Air Pollution.
Resource Paper No. 3, Perspectives on Geomorphic Processes.
Resource Paper No. 4, Spatial Diffusion.
Resource Paper No. 5, Perception of Environment.
Resource Paper No. 6, Social Processes in the City: Race and Urban Residential Choice.
Resource Paper No. 7, The Spatial Expression of Urban Growth.

Technical Papers: The Commission is developing a third series of papers, technical in scope, for college geography instructors as they modify their existing courses and programs. The Technical Papers published since the 1968 report are:

Technical Paper No. 1, Field Training in Geography.
Technical Paper No. 2, Computer Assisted Instruction in Geography.

V. PLANS FOR THE FUTURE: Assuming continued support from NSF, the plans of the Commission during the spring of 1970 to July 1971 period include the development of:

1. Twelve Additional Resource Papers, such as those currently being published. The topics that will be considered will fall in the general areas of: Action Space and the Behavioral Environment; Social Processes in the City; Landscape, Man and Nature; Environmental Systems and Planning; Metropolitan Political Organization, International Political and Economic Integration; The Space Economy; Geography of Change; and Perception of the Environment and Environmental Quality.

2. Four Additional Technical Papers, such as those currently being published. Topics will be selected from the general areas of: Mathematical Applications in Geography; Soil-Water-Plant Energy Balance; Computer Cartography; Statistical Applications in Geography; and Empirical Tests. One of the proposed Technical Papers will be on Geographic Applications of Remote Sensing, which will be developed jointly by the Commission and the Association of American Geographer's Commission on Geographical Applications of Remote Sensing.

3. Five Additional Computer-Assisted Learning Units, such as currently being developed. Investigations will also be made concerning the possibility of organizing two-day regional conferences and a Summer Institute, jointly sponsored by the Commission and a selected university, on computer-assisted instruction for college teachers of geography, including junior college personnel.

4. Meetings of the Panel on Two-Year Colleges. By the spring of 1970, a panel will have completed a report, "Geography in Two-Year Colleges". The panel will also investigate the possibility of developing regional conferences and summer institute for teachers in the two-year colleges, and mechanisms as to how communications might be improved between universities and local two-year colleges in their areas. This panel will work very closely with the Inter-commission Committee on Two-Year Colleges, as well as other professional organizations.

5. An Outline for a Course in Geomorphology; Three Problem-Oriented Case Studies in Physical Geography; and Five Enrichment Papers. These materials will be developed under the supervision of the Panel on Physical Geography established in 1968. The general structure for the geomorphology course outline will be similar in size and scope to CCG Publication No. 7, A Survey Course: The Energy and Mass Budget at the Surface of the Earth. The Panel will also supervise the development of three problem-oriented case study exercises, designed to supplement existing physical geography courses, focusing on actual situations concerned with relevant problems in contemporary society; and will supervise the development of five enrichment papers focusing on factual material not normally available in textbooks or introductory reprint literature.

6. A Consulting Bureau. Due to the many requests received from individuals or institutions to advise them on the development and expansion of geography courses and programs, the Commission in cooperation with the Association of American Geographers, will establish a formal Consulting Bureau. This Bureau will be in operation and available for consulting purposes by the fall of 1970.

7. Meetings of the Panel on Teacher Education. It is proposed that the Commission appoint a panel, working closely with the Association of American Geographers' Committee on Geographic Education, the Consortium of Professional Associations (CONPASS), National Council for Geographic Education, and other groups, to develop a concrete program of action to improve college teaching in geography. It is hoped that the recommendations and structure resulting from these meetings will clearly define the problems in improving college teaching so that the various committees and groups concerned with this problem can focus their efforts along productive lines.

8. Evaluation of the Impact of the Commission's Work. The Commission is in its sixth year of operating activity. It is essential that the Commission determine as precisely as possible what impact it has had to date. In February, 1970, a panel will be established under the direction of J. Thomas Hastings, Director of the Center for Instructional Research and Curriculum Evaluation, to develop an evaluation structure. The evaluations will be made in the spring and summer of 1970. The results of these evaluations will have a direct influence as to future Commission activities and the manner in which some of the Commission work may be assumed by other groups. It is also possible that the evaluations may bring to light new perspectives which have not been investigated to date.

A. NAME OF COMMISSION: COMMISSION ON COLLEGE PHYSICS.

B. PROJECT DIRECTOR: Professor John M. Fowler, Director, Commission on College Physics, 4321 Hartwick Road, College Park, Md. 20740. (301)454-4143.

C. PROJECT HEADQUARTERS:

1. Contact: Project director.
2. Special facilities or activities available for visitor viewing: Library, past and current publications, films.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. Ronald Blum, Staff Physicist; Dr. Daniel P. Detwiler, Staff Physicist; Dr. Richard West, Staff Physicist.

E. PROJECT SUPPORT:

1. Organizational agency: American Association of Physics Teachers.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:

1. Principal originators: Participants at final meeting of series of three national conferences on the improvement of college physics courses, held 1959-1960.
2. Date and place of Initiation: First meeting held June 15-16, 1960; New York.
3. Overall project purpose: "To analyze the aims and substance of college physics courses and the resources for improving such courses, and to formulate plans for the improvement of the teaching of physics at the college level throughout the country", Am. J. Phys., 28, 1960.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: The Commission considers its primary functions to be the collection and dissemination of information about curricular developments, the critical appraisal of the effectiveness of these developments, the consideration of what additional efforts are needed, and the stimulation of responsible groups of physicists toward course and curriculum development. Actual operations, such as the development, production, and distribution of new written materials, apparatus, films, etc., are, of course, the ultimate objectives, but the Commission engages directly in these activities only when it finds urgent needs that are not being met by existing institutions and which do not appear likely to be satisfied by anything less than a national effort for which no present agency exists. (Am. J. Phys., 30, 665, 1962).

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Not applicable.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Not applicable.

K. MATERIALS PRODUCED:

CCP Publications 1966 - 1969

1. Instruction by Design, A Report on the Conference on New Instructional Materials in Physics held at the University of Washington, Summer, 1965 (published May 1966).
2. The Computer in Physics Instruction, Report of the Conference on the Uses of the Computer in Undergraduate Physics Instruction held November 4-6, 1965 at The University of California, Irvine (published July 1966).
3. The Production and Use of Single Concept Films in Physics, Report of the Conference on Single Concept Films in College Physics held December 15-17, 1966, at Rensselaer Polytechnic Institute (published January 1968).
4. Short Films for Physics Teaching, A catalog (published October 1967).
5. Preparing High School Physics Teachers, Report of the Panel on the Preparation of Physics Teachers (published January 1967).
6. Progress Report of the CCP: 1964-1966.
7. The Second Ann Arbor Conference on Curricula for Undergraduate Majors in Physics (1967 reprint).
8. The College Commissions (jointly published by the eight college science commissions), July 1967.
9. Commission on College Physics by John M. Fowler, a reprint from *Physics Today*, March 1967.
10. The Proceedings of the Boulder Conference on Physics for Nonscience Majors, 1964.
11. Progress Report of the CCP: 1962-64.
12. Outline of a Course in Plasma Physics, 1963.
13. Homemade High Vacuum Techniques, CCP Staff and MIT Science Teaching Center, 1964.
14. Undergraduate Curricula in Physics: A Report on the Princeton Conference on Curriculum S, E. Leonard Jossem, 1964.
15. The Berkeley Physics Laboratory, Alan M. Portis, 1964.
16. Sealing with Solder Glass, Robert H. Dalton, 1963.
17. Experiences with Solder Glass and the Student, John G. King, 1964.
18. Power Supply for Penning Vacuum Gauge, Jan Orsula, 1964.
19. Basic Themes of Physics by Edwin A. Uehling (out of print).
20. Bonds Between Atoms by Alan Holden (out of print).
21. Conceptual Foundations of Quantum Mechanics by Leonard Eisenbud.
22. Crucial Experiments in Quantum Physics by George L. Trigg (out of print).
23. Distributions by Wayne A. Bowers.
24. Electricity and Magnetism. I. Electrostatics by Melba Phillips.
25. Electricity and Magnetism. II. Magnetostatics by Melba Phillips.

26. Electricity and Magnetism. III. Circulation Laws and Their Consequences by Richard T. Mara.
27. Experimental Introduction to Kinetic Theory by Harold Daw.
28. Heat and Motion by Norman Pearlman.
29. Heat Motion in Matter by J. Gregory Dash.
30. Interference and Diffraction by Marc H. Ross.
31. Matter in Motion by Robert M. Cotts.
32. Motion by James Gerhart.
33. The Nature of Atoms by Alan Holden.
34. The Symmetry of Natural Laws by Laurie M. Brown.
35. Wave Mechanical Properties of Stationary States by Alan Holden.
36. What Can The Matter Be? by Jack A. Soules.
37. Introductory Computer-Based Mechanics, A One-Week Sample Course, by Alfred M. Bork, Arthur W. Luehrmann, J.W. Robson.
38. Computer-Based Physics: An Anthology, edited by Ron Blum, CCP.
39. Progress Report of the Commission on College Physics, 1966-1968.
40. Film Repository, a brochure containing a brief description of each film, a price list, and an order form.
41. Computer Library in Physics (CLIP), a description of current holdings, how to submit new programs, and how to obtain copies of library holdings.
42. Laboratory Packet: The Divergent Laboratory, J.W. George Ivany and Malcolm R. Parlett; The Instrumented Laboratory, Jack A. Soules and Robert B. Bennett; Variations on the Falling Body Experiment, Harold A. Daw and John M. Fowler; Some Experiments on Wave Motion Using Sound, Robert B. Bennett.
43. Physical Science for Nonscience Students (PSNS) by Elizabeth A. Wood.
44. CCP Newsletters No. 1-22.
44a. CCP Biennial Report, 1968-70.

Momentum Books
45. Elementary Particles by David H. Frisch and Alan M. Thorndike.
46. Radio Exploration of the Planetary System by Alex G. Smith and Thomas D. Carr.
47. The Discovery of the Electron by David L. Anderson.
48. Waves and Oscillations by R.A. Waldron.
49. Crystals and Light by Elizabeth A. Wood.
50. Temperatures Very High and Very Low by Mark W. Zemansky.
51. Polarized Light by William A. Shurcliff and Stanley S. Ballard.
52. Structure of Atomic Nuclei by C. Sharp Cook.
53. An Introduction to the Special Theory of Relativity by Robert Katz.
54. Radioactivity and Its Measurement by W.B. Mann and S.B. Garfinkel.
55. Plasmas--Laboratory and Cosmic by Forrest I. Boley.

56. Infrared Radiation by Ivan Simon.
57. The Physics of Musical Sound by Jess J. Josephs.
58. The Freezing of Supercooled Liquids by Charles A. Knight.
59. Radio Exploration of the Sun by Alex G. Smith.
60. Magnets by L.W. McKeehan.
61. The World of High Pressure by John W. Stewart.
62. Magnetohydrodynamics by Noel C. Little.
63. The Winds by George M. Hidy.

L. MATERIALS AVAILABLE FREE: Items 1-44 under K are available free of charge from the CCP office; however, please note the following materials are out of print: No. 1, 2, 4, 5, 19-36.

M. MATERIALS PURCHASABLE:
2. $3.88, ERIC Document Reproduction Service, The National Cash Register Co., 4936 Fairmont Avenue, Bethesda, Maryland 20019 - Order No. ED 010 764.
5. $1.35, same source and address as above, order No. ED 029 775.
33. $3.85, same source and address as above, order No. ED 025 412.
45-63. $1.95 from Van Nostrand & Co., 120 Alexander Street, Princeton, N.J.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: The revision of publications (presently out of print) listed under K: No. 4, 5.
1. Conference Report: Graduate Preparation for Teaching: The Missing Component.
2. Report on the Divergent Laboratory.
3. Report on the Technical Physics Conference.
4. Report on the Preparation of Two-Year College Teachers.

Q. PROJECT IMPLEMENTATION: Not applicable.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the materials: Not applicable.
2. Activities conducted for pre-service and in-service teacher training: Not applicable.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: "Preparing High School Physics Teachers" Report of the Panel on the Preparation of Physics Teachers, January 1968 (out of print, but to be updated, see P.)
"Graduate Preparation for Teaching: The Missing Component" (see P). "The Preparation of College Physics Teachers" (Conference Background Paper, 1969).

S. PROJECT EVALUATION: None.

T. PROJECT PUBLICITY:

1. John M. Fowler and Richard West, "What Our Left Hand Has Been Doing," Physics Today, March 1970, pp. 24-32.
2. "Progress Report of the Commission on College Physics," American Journal of Physics, 36, 1033 (1968).
3. "What Should We Do for the Commission on College Physics," Physics Today, November 1969, p. 120.

U. SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT:

1. Conference on Physics for Technical Curricula.
2. Conference on the Preparation of Two-Year College Teachers.
3. Conference on Preparing High School Physics Teachers.
4. Conference on Preparation of Graduate Students for Teaching: The Missing Component.
5. Follow-up Workshop on Divergent Laboratory.

V. PLANS FOR THE FUTURE:

1. Conference on Computers in Undergraduate Science Education, August 1970.
2. Conference on Instructional Resources Centers, May 1970.
3. Workshop on Instrumented Laboratory, July 1970.
4. Four Regional Conferences on the Preparation of Graduate Students for Teaching, September, October, November, December 1970.
5. Final Review Conference, June 1971.
6. Phase-out by 31 August 1971.
7. Publications: see under P.

A. NAME OF COMMISSION: COMMISSION ON EDUCATION IN AGRICULTURE AND NATURAL RESOURCES (CEANAR).

B. CHAIRMAN OF COMMISSION: Dr. Russell E. Larson, Dean, College of Agriculture, Pennsylvania State University, Armsby Building, University Park, Pennsylvania 16802.

C. PROJECT HEADQUARTERS:
1. Contact: CEANAR, Division of Biology and Agriculture, National Academy of Sciences, Washington, D. C. 20418.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Dr. R. B. Stevens, Executive Secretary, Division of Biology and Agriculture; Dr. M. R. DeCarlo, Asst. Exec. Sec'y., Division of Biology and Agriculture.

E. PROJECT SUPPORT:
1. Organizational agencies: Agriculture Board, Division of Biology and Agriculture, National Academy of Sciences - National Research Council.
2. Funding agency: National Science Foundation.

F. PROJECT HISTORY:
1. Principal originator: Organizational sponsor.
2. Date and place of Initiation: 1961; National Academy of Sciences - National Research Council.
3. Overall project purpose: See section H.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: The Commission has two major purposes. The first is to review trends in education in agriculture for students majoring in agriculture; to stimulate discussion, re-evaluation and improvement in undergraduate courses and curricula; and to prepare recommendations for the development of academic programs in the future. The second is to assist in the development of the agricultural and natural resource aspects of general education.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Not applicable.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: College level.

K. MATERIALS PRODUCED:
1. Pub. No. 1486 - Undergraduate Teaching in the Animal Sciences, pp. 84, 1967, $3.00.
2. Pub. No. 1495 - Undergraduate Education in Biological Sciences for Students in Agriculture & Natural Resources, pp. 104, 1967, $3.00.

3. Pub. No. 1537 - Undergraduate Education in Renewable Natural Resources: An Assessment, 36 pp. 1967, $2.00.

L. MATERIALS AVAILABLE FREE: Supply exhausted.

M. MATERIALS PURCHASABLE: See K above.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None planned.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Reports of recent conferences.

Q. PROJECT IMPLEMENTATION: Not applicable.

R. TEACHER PREPARATION:

1. Consultant services available for teachers using the materials: Not answered.
2. Activities conducted for pre-service and in-service teacher training: Not answered.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Only material now available listed under K.

S. PROJECT EVALUATION:

1. Has the effectiveness of the materials been evaluated? Yes, by project staff.
2. Pertinent published research studies: Not applicable.
3. Brief abstract of in-house or unpublished research: Not applicable.

T. PROJECT PUBLICITY:

Various professional journals, e.g.,

Food Technology
Feed Age
BioScience
Science Education
American Biology Teacher
Journal of Forestry
Journal of Farm Economics
Journal of Dairy Science
Journal of Animal Science

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Not answered.

V. PLANS FOR THE FUTURE: Project is to be terminated in mid-1970.

A. NAME OF COMMISSION: COMMISSION ON UNDERGRADUATE EDUCATION IN THE BIOLOGICAL SCIENCES (CUEBS).

B. DIRECTOR: Dr. Edward J. Kormondy, Director, CUEBS, 3900 Wisconsin Avenue, Washington, D. C. 20016. 244-5581.

C. PROJECT HEADQUARTERS:
1. Contact: Director.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: Senior Staff Biologist: Dr. Dana L. Abell; Staff Biologists: Dr. Joan G. Creager, Dr. Donald S. Dean, Dr. Darrel L. Murray, Dr. John D. Withers.

E. PROJECT SUPPORT:
1. Organizational agencies: None.
2. Funding agencies: National Science Foundation grant to the American Institute of Biological Sciences (AIBS).

F. PROJECT HISTORY:
1. Principal originators: Education Committee, AIBS.
2. Date and place of Initiation: July 1, 1963; Washington University, St. Louis.
3. Overall project purpose: Improvements of undergraduate biological education.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: The Commission was established to analyze objectively the present status of biology in American colleges and universities. Biologists throughout the country have participated in study panels to make recommendations on ways and means of solving problems in undergraduate biological education. The primary concern of the Commission is to assure that college biology courses reflect the modern discipline by shortening the time gap between the publication of research results and their reporting in the classroom. Program emphasis is on improving and modernizing biology curricula, as well as assisting instructional personnel to keep informed on developments in modern biology.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Not applicable.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Undergraduate biology.

K. MATERIALS PRODUCED:
1. New Directions in Biology Teaching. Thomas S. Hall, 1964. BioScience, 14 (4): 31-33. (out of print).
2. Report on Activities of the Commission on Undergraduate Education in the Biological Sciences, July 1, 1963 - June 30,

1964. July, 1964. (out of print).

3. Core Studies for Undergraduate Majors. 1964. BioScience, 14(8):25-29. (out of print).
4. Some Information About CUEBS. August, 1964. (out of print)
5. Undergraduate Origins of Nonservice Fellows in the Biological Sciences. September, 1964. (out of print).
6. Report of the Western Regional Conference on Courses and Curricula in the Biological Sciences. December, 1964. (out of print).
7. The Consultant Bureau. December, 1964. (revised August, 1969).
8. Report of the Midwestern Regional Conference on Courses and Curricula in the Biological Sciences. February, 1965. (out of print).
9. Report of the Northeastern Regional Conference on Courses and Curricula in the Biological Sciences. April, 1965. (out of print).
10. Report of the Southeastern Regional Conference on Courses and Curricula in the Biological Sciences. July, 1965. (out of print).
11. Report of the Conference on the Training of Biology Teachers. May, 1965. (out of print).
12. Preparing the Modern Biology Teacher. Benson E. Ginsburg, 1965. BioScience, 15(12):769-772. (out of print).
13. CUEBS and the Preparation of Biology Teachers. Ted F. Andrews, 1965. NABT News and Views, 9(4): 1 p. (out of print).
14. Report of the Panel on Instructional Materials and Methods. January, 1967. (out of print).
15. Biology in a Liberal Education. February, 1967. (out of print).
16. Guidelines for Planning Biological Facilities (published in conjunction with the American Institute of Biological Sciences). August, 1966.
17. Report of the Panel on Pre-Professional Training in the Agricultural Sciences. 1967. CUEBS News 3(4)3-5. (out of print).
18. Content of Core Curricula in Biology. June, 1967. (out of print).
19. Biology for the Non-Major. July, 1967.
20. Testing and Evaluation in the Biological Sciences. November, 1967.
21. Reports of the Action Committees, Panel on Pre-Professional Training in the Agricultural Sciences. October, 1967. (out of print).
    a. An Opinion Concerning Tomorrow's College of Agriculture.
    b. Report of the Action Committee on Animal Sciences.
    c. Report of the Action Committee on Bioengineering.
    d. Report of the Action Committee on Food Sciences.
    e. Report of the Action Committee on Natural Resources.
    f. Report of the Action Committee on Plant and Soil Sciences.

g. Report of the Action Committee on Social Sciences.
22. Basic Library List for the Biological Sciences. March 1969.
23. Teaching and Research. May, 1969.
24. The Pre-Service Preparation of Secondary School Biology Teachers, June, 1969.
25. Biology in the Two-Year College. April, 1969.
26. Biological Prerequisites for Education in the Health Sciences. June, 1969.
27. Investigate Laboratory Programs in Biology. December, 1969.

CUEBS Working Papers:
1. A Symposium on Investigative Laboratory Programs in Biology. December, 1969.

CUEBS News:
1. Vol. I, Nos. 1 and 2, 1965.
2. Vol. II, Nos. 1 - 6, 1965-66.
3. Vol. III, Nos. 1 - 6, 1966-67.
4. Vol. IV, Nos. 1 - 6, 1967-68.
5. Vol. V, Nos. 1 - 6, 1968-69.
6. Vol. VI, Nos. 1 - 3, 1969-70.

L. MATERIALS AVAILABLE FREE:
From CUEBS: Publications, 19, 22, 23, 24, 25, 26, 27; Working Papers No. 1; CUEBS News.
From Office of Biological Education, American Institute of Biological Sciences, 3900 Wisconsin Avenue, N. W., Washington, D. C. 20016, Publications, 7, 16, 20.

M. MATERIALS PURCHASABLE: None (all free on request).

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED: Comprehensive Review of the Pre-service Preparation of College Biology Teachers; Guidelines to and Examples of Investigative Laboratories; Sources of Funds in Biology; Revision of Basic Library List; Survey of Undergraduate Curricula in Biology; Examples of Biology Courses for Non-Majors; The Interpolation of History and Philosophy in Introductory Biology; Survey of Audio-tutorial and Computer Applications in Biology; Guidelines to Workshops in Simulated Science Teaching for Secondary School Teachers; Articulation Models for Two and Four-Year Colleges; Survey of Status of Teaching in the Two-Year College.

Q. PROJECT IMPLEMENTATION: Not applicable.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using the

materials: Not applicable.

2. Activities conducted for pre-service and in-service teacher training: We have conducted a workshop conference on the technique of simulated science teaching (i.e., role playing) in the preparation of secondary school teachers. This was a "one-shot" affair intended to spread the word and to stimulate such workshops elsewhere.

3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: Publication No. 25 (see section K above).

S. PROJECT EVALUATION: This project has been evaluated informally by project staff and by the National Science Foundation. No formal evaluative research studies have been undertaken.

T. PROJECT PUBLICITY: Reference to CUEBS' activities are widely dispersed in the educational literature; we have not, however, attempted a systematic effort to catalog or search out these references.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Publications 22-27 have been released, each representing a major CUEBS project. Committees and panels have been concerned with: structure and explanation in biology, the laboratory, preservice preparation for college teaching, two-year colleges with particular reference to personnel and technician training, undergraduate curriculum.

V. PLANS FOR THE FUTURE: Emphasis on the development of improved and modernized courses and curricula will continue, with consideration of the needs of various groups of students including those planning graduate study in biology as well as those preparing for careers at the baccalaureate level. Application of the audio-tutorial method and of the computer to biological education will be explored. Concerted effort is anticipated on courses cognate to biology and to the relation of biology to the social and engineering sciences. Conferences, committees and surveys are the mechanisms for these efforts, each of which will likely result in publication, as is also true for projects in process (see P & U).

A. NAME OF COMMISSION: COMMITTEE ON THE UNDERGRADUATE PROGRAM IN MATHEMATICS (CUPM).

B. COMMISSION CHAIRMAN: Ralph P. Boas, Department of Mathematics, Northwestern University, Evanston, Illinois 60201. (312)492-3377.

C. PROJECT DIRECTOR:

1. Contact: George Pedrick, Executive Director (after September 1, 1970, Paul T. Mielke), CUPM, P.O. Box 1024, Berkeley, California 94701. (415)527-2363.
2. Special facilities or activities available for visitor viewing: None.

D. PRINCIPAL PROFESSIONAL STAFF: George Pedrick, Executive Director; Paul T. Mielke, Associate Director; Stephen H. Friedberg, Staff Mathematician; S. Katherine Magann, Administrative Assistant.

E. PROJECT SUPPORT:

1. Organizational agencies: Mathematical Association of America.
2. Funding agencies: National Science Foundation.

F. PROJECT HISTORY:

1. Principal originator: Mathematical Association of America.
2. Date and place of Initiation: 1959; Not answered.
3. Overall project purpose: The study and improvement of college mathematics curricula and instruction.

G. PRESENT COMMERCIAL AFFILIATIONS: None.

H. PROJECT OBJECTIVES: Not answered.

I. METHODS OF INSTRUCTION USED IN THE PROJECT: Not answered.

J. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: All college mathematics.

K. MATERIALS PRODUCED: Starred items are out of print.

*1. Course Guides for the Training of Teaching of Junior High and High School Mathematics (1961).

*2. Recommendations on the Undergraduate Mathematics Program for Work in Computing (1964).

3. Tentative Recommendations for the Undergraduate Mathematics Program for Students in the Biological, Management, and Social Sciences (1964).

4. A General Curriculum in Mathematics for Colleges (1965).

5. CUPM Basic Library List (1965).

*6. Teacher Training Supplement to the Basic Library List (1965).

7. Pregraduate Preparation of Research Mathematicians (Revised 1965).
8. Preparation for Graduate Study in Mathematics (1965).
9. A Curriculum in Applied Mathematics (1966).
10. Mathematical Engineering: A Five Year Program (1966).
*11. Recommendations for the Training of Teachers of Mathematics (Revised 1966).
12. Report No. 15 - Forty-one Conferences on the Training of Teachers of Elementary School Mathematics (1966).
*13. Geometry Conference Proceedings (1967).
14. Qualifications for a College Faculty in Mathematics (1967)
15. Recommendations on the Undergraduate Mathematics Program for Engineers and Physicists (Revised 1967).
*16. Course Guides for the Training of Teachers of Elementary School Mathematics (Revised 1968).
17. A Beginning Graduate Program in Mathematics for Prospective Teachers of Undergraduates (1966).
18. A Transfer Curriculum in Mathematics for Two Year Colleges (1969).
19. Qualifications for Teaching University Parallel Mathematics Courses in Two Year Colleges (1969).

Newsletters
*20. Number 1 - Staff Problems in the Colleges (1967).
21. Number 2 - A Survey of CUPM Activities (1968).
22. Number 3 - Teaching Assistants (1968).
23. Number 4 - Calculus With Computers (1969).

L. MATERIALS AVAILABLE FREE: All unstarred items in section K.

M. MATERIALS PURCHASABLE: None.

N. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

O. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: None.

P. ADDITIONAL MATERIALS BEING DEVELOPED:
1. Recommendations for the Undergraduate Mathematics Program for Students in the Life Sciences.
2. Recommendations on Undergraduate Preparation for Graduate Work in Statistics.

Q. PROJECT IMPLEMENTATION: Does not apply.

R. TEACHER PREPARATION:
1. Consultant services available for teachers using your materials: CUPM maintains a Consultants Bureau whose members visit individual institutions to give advice and obtain information. Requests for Consultants service are directed to the Central Office. An average of 40-50 visits per year are arranged.

2. Activities conducted for pre-service and in-service teacher training: None.
3. Available pre-service and/or in-service teaching materials for science educators to use in preparing teachers: None.

S. PROJECT EVALUATION:
1. Has the effectiveness of the materials been evaluated: Not answered.
2. Pertinent published research studies: Not answered.
3. Brief abstract of in-house or unpublished research: Not answered.
4. Additional evaluative data available to interested individuals: J. E. Lightner, in his Ohio State University doctoral thesis, has documented the effect of CUPM recommendations on 20 four-year colleges in Maryland. A summary of his findings appeared in the American Mathematical Monthly, Vol. 76, No. 6, June-July, 1969 (pp. 681-686).

T. PROJECT PUBLICITY: Duren, W. L., "CUPM, The History of an Idea," American Mathematical Monthly, Vol. 74, No. 1, January 1967.

U. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: See items 16-23 under paragraph K above for CUPM publications which have appeared since the last report.

V. PLANS FOR THE FUTURE: Current and future activities include: (for the biennium 1970-72)
1. Revision by the Panel on Teacher Training of recommendations and course guides for the training of teachers of elementary, junior high and high school mathematics. Completion of the recommendations will be followed by a series of conferences. The Panel will next address itself to three problems: the training of mathematics supervisors, a content and objectives course and the post-graduate training of teachers.
2. Conferences by the Panel on College Teacher Preparation on items 4, 14 and 17 under paragraph K above. The Panel will also produce resource papers in its area of concern.
3. Conferences by the Panel on Mathematics in Two Year Colleges on items 18 and 19 of paragraph K. The Panel is now addressing itself to non-transfer curricula and, in particular to a course in basic mathematics.
4. Preparation by the Panel on Applied Mathematics of a first course in applied mathematics and of resource papers on applications.
5. Preparation by the Panel on Computing of recommendations for a major in mathematics with a concentration in computing. The Panel will also continue to work on the role of computers in specific mathematics courses.
6. Search by a Task Force on Problems in College Teaching for ways to increase the effectiveness of mathematics teaching in

general.
7. Consideration by a Task Force on Minority Groups of the special problems of such groups.
8. Revision of item 4, paragraph K by a special Task Force.
9. Revision of the Basic Library List by the Advisory Group on Communications.
10. Continuation of the Consultants Bureau, which is entering on a new phase of increased service to two-year colleges as a result of items 18 and 19, paragraph K.

A. NAME OF COMMISSION: COUNCIL ON EDUCATION IN THE GEOLOGICAL SCIENCES (CEGS).

B. COMMISSION CHAIRMAN: Dr. George R. Rapp, Jr., Chairman (CEGS), Department of Geology and Geophysics, University of Minnesota, Minneapolis, Minnesota 55455. (612)373-4047.

C. PROJECT DIRECTOR: Dr. Peter Fenner.

D. PROJECT HEADQUARTERS:
1. Contact: The Director or Adm. Ass't., CEGS, American Geological Institute, 2201 M St., N.W., Washington, D.C. 20037. (202)296-7951.
2. Special facilities or activities available for visitor viewing: Friendly staff.

E. PRINCIPAL PROFESSIONAL STAFF: Dr. Peter Fenner, Executive Director; Murray Felsher, Associate Director; Marilyn Lerette, Administrative Assistant.

F. PROJECT SUPPORT:
1. Organizational agency: American Geological Institute.
2. Funding agency: National Science Foundation.

G. PROJECT HISTORY:
1. Principal originator: American Geological Institute.
2. Date and place of Initiation: February 1965; Baylor University, Waco, Texas.
3. Overall project purpose: To carry out the recommendations made by its predecessor, GEO-Study (1962-1964). GEO-Study was organized to investigate the status of undergraduate geological education in response to charges that geology lacked purpose and direction, that its curricula were outmoded and obsolete, that it was static and no longer attracted gifted students. CEGS, therefore, is an action agency whose objectives have been derived from the findings of GEO-Study.

H. PRESENT COMMERCIAL AFFILIATIONS: McGraw-Hill -- publishers of instructional materials program modules.

I. PROJECT OBJECTIVES: To maintain continuous inquiry into the state of geological education at the undergraduate level and to provide detailed recommendations and guidelines in problem areas; to encourage and assist in the development of new educational materials and programs; to review and evaluate projected programs in geologic education and provide for communication and central consultation on educational improvement in the geological sciences; and to work through existing organizations and involve the widest spectrum of the teaching profession in various activities.

J. METHODS OF INSTRUCTION USED IN THE PROJECT: Not applicable.

K. SPECIFIC SUBJECTS, GRADE, AGE AND ABILITY LEVELS: Geological education; undergraduate and for teachers of undergraduates.

L. MATERIALS PRODUCED: * Indicates out-of-print, 19 Jan 1970.
CEGS CONTRIBUTION SERIES (in Journal of Geological Education)

*1. Mathematics Recommendations for Undergraduate Geology Students, by the GeoStudy Mathematics Panel. (Vol. XIII No. 3, June 65, p. 91-92).
*2. Evolution as a Geologic Concept: An Introductory Geology Course, by Leo F. Laporte. (Vol. XIII No. 4, Oct. 65, p. 115-116).
*3. Courses in Geology for Advanced Non-majors, by John Eliot Allen. (Vol. XIII No. 5, Dec. 65, p. 145-147).
*4. Introductory Geology in the Framework of Liberal Arts Studies, by Claude Albritton and others. (Vol. XIII No. 5, Dec. 65, p. 147-149).
*5. Recommendation: Academic Preparation of Secondary School Earth Science Teachers, by William M. Merrill and others. (Vol. XIV No. 1, Feb. 66, p. 29-32).
*6. Geology as an Interdisciplinary Experimental Science, by O.T. Hayward. (Vol. XIV No. 2, April 66, p. 66-68).
7. Keeping Abreast of the Wave, by William R. Muehlberger. (Vol. XIV No. 4, Oct. 66, p. 138-139).
8. Paperback Books for Earth Science Teachers, by Cleo V. Proctor, Jr. (Vol. XV No. 1, Feb. 67, p. 29-55).

CEGS SHORT REVIEW SERIES (in Journal of Geological Education)

1. Experimental Petrology: An Indoor Approach to an Outdoor Subject, by Peter J. Wyllie. (Vol. XIV No. 3, June 66, p. 93-97).
2. The Development and Evolution of Hillslopes, by S.A. Schumm. (Vol. XIV No. 3, June 66, p. 98-104).
3. Heat Flow in the Earth, by Gene Simmons. (Vol. XIV No. 3, June 66, p. 105-110).
4. Shock Processes in Geology, by Nicholas M. Short. (Vol. XIV No. 4, Oct. 66, p. 149-166).
*5. Pediments and Pediment-Form Processes, by Richard F. Hadley. (Vol. XV No. 2, Feb. 67, p. 83-89).
6. Rates of Denudation, by Dale F. Ritter. (Vol. XV No. 4, Oct. 67, p. 154-159).
7. Recent Carbonate Sediments -- An Unconventional View, by Keith E. Chave. (Vol. XV No. 5, Dec. 67, p. 200-204).
8. High Pressure Geophysics -- Equipment and Results, by Gene Simmons. (Vol. XVI No. 1, Feb. 68, p. 21-29).
9. Alluvial Fans, by William B. Bull. (Vol. XVI No. 3, June 68, p. 101-106).
10. Sea-Floor Spreading -- New Evidence, by F.J. Vine. (Vol. XVII No. 1, Feb. 69, p. 6-16).

11. Paleoecology: Fossils and Their Environments, by Leo F. Laporte. (Vol. XVII No. 3, June 69, p. 75-80).
12. Undergraduate Instruction in Geomathematics, by Robert H. Osborne. (Vol. XVII No. 4, Oct. 69, p. 120-124).
13. Computer-Oriented Laboratory Exercises for Geology and Oceanography, by William T. Fox. (Vol. XVII No. 4, Oct. 69, p. 125-134).
14. Guide to Geological Literature, by H.W. Smith. (Vol. XVIII, No. 1, Jan. 70, p. 13-25.

CEGS PROGRAMS PUBLICATION SERIES

1. Problems in Physical Geology, by George R. Rapp, Jr. and others. (Journal of Geological Education, Vol. XV No. 6, Dec. 67, p. 219-279). Now only available without answers.
*2. Annotated Bibliography of Statistical Applications in Geology, by James C. Howard. 24 p. (1968).
3. Fund Sources for Undergraduate Geology, edited by Peter Fenner. 13 p. (1969).

**Models of Geologic Processes. 1969 Short Course Lecture Notes: $8.50. Available from AGI Publication Sales Department.

NEWSLETTER (published 10 times per year)

M. MATERIALS AVAILABLE FREE: All non-asterisked items free from CEGS in single-copy quantities. Asterisked items are out of print. Other sources are shown.

N. MATERIALS PRUCHASABLE: Double asterisked item $8.50 from AGI publication sales. Modules in preparation will be available from McGraw-Hill, 330 West 42nd Street, New York, New York 10036.

O. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English.

P. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE TRANSLATED: Unknown at this time.

Q. ADDITIONAL MATERIALS BEING DEVELOPED:
Up to 12 Instructional Materials Modules.
About 12-18 Short Reviews.
Probably another set or two of Short Course Notes.
Several CEGS Programs Publications, including final Panel reports and position papers.

R. PROJECT IMPLEMENTATION: Not applicable.

S. TEACHER PREPARATION: Not applicable.

T. PROJECT EVALUATION: All modules are class-tested at several institutions.

U. PROJECT PUBLICITY: Many short notes have been published. No feature-length articles in fully professional journals.

V. BRIEF SUMMARY OF PROJECT ACTIVITIES SINCE 1968 REPORT: Fenner moved to Executive Director; Rapp moved to Chairman; Analysis of Skills completed; final report in final stage of preparation. New concept of "Sequences" developed: annotated bibliography - short reviews-short courses-seminars-symposia; all integrated, with hard-copy fallout (first sequence in area of quantitative geology). New personnel in some Panels. Five instruction materials modules completed or nearly so; others introductory geology and curriculum in preparation. Earth Science Teacher Preparation Panel formed.

W. PLANS FOR THE FUTURE: Virtually all new projects now in progress. Phase out is planned for December 31, 1971. Some publications might be issued shortly thereafter, but mainly it will be a clean-up operation then.

Completed or Inactive Projects

COMPLETED OR INACTIVE PROJECTS

According to our information, we believe that the following projects are no longer engaged in the production of materials. For information about them consult previous Clearinghouse Reports or contact persons listed below.

1. a. PROJECT TITLE: ADVISORY COUNCIL ON COLLEGE CHEMISTRY.
   b. CONTACT: Dr. L. Carroll King, Department of Chemistry, Northwestern University, Evanston, Illinois 60201.

2. a. PROJECT TITLE: CALCULATORS IN A GENERAL MATH LABORATORY.
   b. CONTACT: Mr. Gene Catterton, P.O. Box 69, Wynne, Arkansas 72396.

3. a. PROJECT TITLE: CHEMICAL BOND APPROACH PROJECT (CBA).
   b. CONTACT: Dr. Laurence E. Strong, CBA, Earlham College, Richmond, Indiana 47375.

4. a. PROJECT TITLE: CONCEPTUAL SCHEMES IN SCIENCE: A BASIS FOR CURRICULUM DEVELOPMENT.
   b. CONTACT: Albert F. Eiss, Associate Executive Secretary National Science Teachers Association, 1201 Sixteenth St., N.W., Washington, D.C. 20036.

5. a. PROJECT TITLE: ELEMENTARY SCHOOL SCIENCE PROJECT (ESSP-USU).
   b. CONTACT: Walter L. Sounders, ESSP-USU, Physics Department, Utah State University, Logan, Utah 84321.

6. a. PROJECT TITLE: ELEMENTARY SCIENCE PROJECT OF THE ONTARIO CURRICULUM INSTITUTE (OCI).
   b. CONTACT: Douglas A. Roberts, Department of Curriculum, The Ontario Institute for Studies in Education, Bloor Street West, Toronto 181, Ontario.

7. a. PROJECT TITLE: GENERAL MATHEMATICS I & II WRITING PROJECT.
   b. CONTACT: George W. Hudson, Coordinator, Secondary Instructional Services, Albuquerque Public Schools, P.O. Box 1927, Albuquerque, New Mexico 87103.

8. a. PROJECT TITLE: THE NORDIC COMMITTEE FOR THE MODERNIZING OF SCHOOL MATHEMATICS.
   b. CONTACT: Dr. Lennart Sandgren, The Nordic Committee for the Modernizing of School Mathematics, Department of Education, Stockholm 2, Sweden.

9. a. PROJECT TITLE: NSTA-NASA AEROSPACE SCIENCE EDUCATION PROJECT.
   b. CONTACT: Albert F. Eiss, Associate Executive Secretary National Science Teachers Association, 1201 Sixteenth St., N.W., Washington, D.C. 20036.

10. a. PROJECT TITLE: THE NUFFIELD JUNIOR SCIENCE TEACHING PROJECT.
    b. CONTACT: Mr. E.R. Wastnedge, Nuffield Junior Science Project, 84 Cleveland Avenue, Darlington, Co. Durham, England. Tel. Darlington 6-6655.

11. a. PROJECT TITLE: NUFFIELD O-LEVEL BIOLOGY.
    b. CONTACT: W.H. Dowdeswell, Nuffield O-Level Biology, Winchester College, Hampshire, Winchester, England. Tel. Winchester 4584.

12. a. PROJECT TITLE: PHYSICAL SCIENCE STUDY COMMITTEE PHYSICS (PSSC).
    b. CONTACT: Miss G. Kline, PSSC, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160.

13. a. PROJECT TITLE: PORTLAND PROJECT--INTEGRATION OF CHEMISTRY AND PHYSICS FOR SECONDARY SCHOOLS.
    b. CONTACT: Dr. Michael Fiasca, Portland Project, Portland State College, P.O. Box 751, Portland, Oregon 97207. Tel. (503)226-7271, Ext. 291.

14. a. PROJECT TITLE: PROGRAM FOR PRE-COLLEGE CENTERS, CURRICULUM RESOURCES GROUP (CRG).
    b. CONTACT: Mrs. Emily Morrison, CRG, Institute for Services to Education, 55 Chapel Street, Newton, Massachusetts 02160. Tel. (617)969-4615.

15. a. PROJECT TITLE: PSSC ADVANCED TOPICS.
    b. CONTACT: Miss G. Kline, PSSC Advanced Topics, Education Development Center, 55 Chapel Street, Newton, Massachusetts 02160.

16. a. PROJECT TITLE: THE PSYCHOLOGY AND MATHEMATICS PROJECT.
    b. CONTACT: Richard R. Skemp, Child Study Unit, University of Manchester, Manchester 13, England.

17. a. PROJECT TITLE: INTER-AMERICAN PROJECT FOR THE IMPROVEMENT OF SCIENCE TEACHING - PROJECT 212.
    b. CONTACT: Pan American Union, Washington, D.C. 20006. SCA/SD.

18. a. PROJECT TITLE: THE SPECIAL PROJECT STP-5/SP SCANDINAVIA FOR PILOT COURSES IN CHEMISTRY.
    b. CONTACT: Gustaf Ahman, The National Board of Education, Fack, Stockholm 22, Sweden.

19. a. PROJECT TITLE: SCHOOL SCIENCE CURRICULUM PROJECT (SSCP).
    b. CONTACT: Richard F.P. Salinger, SSCP, 1102 West Main Street, University of Illinois, Urbana, Illinois 61801.

20. a. PROJECT TITLE: SPECIAL MATERIALS SCIENCE PROJECT (SMSP).
    b. CONTACT: John J. Rizza, 13 Sunrise Drive, RD 4,
    Mahopac, New York 10541.

1970 Questionnaires Not Received as of April 24, 1970

1970 QUESTIONNAIRES NOT RECEIVED AS OF APRIL 24, 1970
(INTERNATIONAL)

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AFGHANISTAN:

TCCU AFGHANISTAN CURRICULUM PROJECT.

CONTACT: Chief of Party, USAID/TCCU Kabul, Department of State, Washington, D.C. 20521

AUSTRALIA:

EDUCATION DEPARTMENT OF WESTERN AUSTRALIA, EXPERIMENTAL SECONDARY SCHOOL MATHEMATICS, YEARS 1-3.

CONTACT: J.R. Greenway, Superintendent of Mathematics, Education Department, Parliament Place, West Perth, Western Australia 6005. Tel. 23-0221.

VICTORIA DEPARTMENT OF EDUCATION SCIENCE CURRICULUM PROJECT.

CONTACT: R.W. Cowban, Curriculum Officer, Curriculum and Research Branch, Education Department, 107 Russell Street, Melbourne, C.I. Victoria, Australia.

CEYLON:

CAAS SCHOOL BIOLOGY PROJECT.

CONTACT: V. Basnayake, Ceylon Association for the Advancement of Science, 55 Torrington Square, Colombo 7, Ceylon.

CHINA:

ADAPTATION OF THE BSCS YELLOW VERSION HIGH SCHOOL BIOLOGY INTO CHINESE LANGUAGE (CHINESE BSCS).

CONTACT: T.P. Koh, Director, Science Education Center (Chinese Cultural College), P.O. Box 5052, Taipei, Taiwan (Formosa), China.

GREAT BRITAIN:

MIDLANDS MATHEMATICS EXPERIMENT (M.M.E.).

CONTACT: Cyril Hope, Worcester College of Education, Henwick Grove, Worcester, U.K. Tel. Worcester 25131.

NUFFIELD SCIENCE TEACHING PROJECT: PHYSICAL SCIENCE COURSE.

CONTACT: Dr. J.E. Spice, 12 Kingsgate Street, Winchester, England. Tel. Winchester 5015.

NUFFIELD SCIENCE TEACHING PROJECT, SECONDARY SCIENCE SECTION.

CONTACT: Mrs. Hilda Misselbrook, Nuffield Foundation Science Teaching Project, Pulton Place, Fulham, London S.W.6, U.K. Tel. 01-736-3401.

ISRAEL:

EXPERIMENTAL PHYSICS PROGRAMME FOR SECONDARY SCHOOLS.

CONTACT: Professor D. Samuel, Director General, The Weizman

Institute of Science, Rehovoth, Israel. Tel. 951721, Ext. 2316.

THE TEACHING OF MATHEMATICS IN HIGH SCHOOLS.

CONTACT: Prof. S.A. Amitsur, Department of Mathematics, Hebrew University, Jerusalem, Israel; Mr. A. Marcus, Ministry of Education, High School Department, Shivtey Israel Street, Jerusalem, Israel.

ITALY:

PSSC PILOT EXPERIMENT.

CONTACT: G. Puppi, Instituto di Fisica dell'Universita, Via Irnerio, 46 - Bologna, Italy. Tel. 260991.

NETHERLANDS:

A PROGRAMMED FIRST COURSE IN ALGEBRA (HYBRID FORM).

CONTACT: Dr. Lucas N.H. Bunt, A Programmed First Course in Algebra (Hybrid Form), Institute for the Training of Secondary School Teachers, University of Utrecht, Lucas Bolwerk 11, Utrecht, Netherlands.

PERU:

INSTITUTO PARA LA PROMOCION DE LA ENSENANZA DE LA BIOLOGIA, (INSTITUTE FOR THE ADVANCEMENT OF BIOLOGY TEACHING).

CONTACT: Paul Ishiyama, Universidad Peruana Cayetano Heredia. Apartado 5045, Lima, Peru.

INSTITUTO PARA LA PROMOCION DE LA ENSENANZA DE LAS MATEMATICAS.

CONTACT: Jose Tola, Universidad Nacional de Ingenieria, Apartado 4153, Lima, Peru. Tel. 7-0297.

PHILIPPINES:

ELEMENTARY SCIENCE CURRICULUM DEVELOPMENT (ESCD).

CONTACT: Mr. Aurelio Juele, Science Education Section, Bureau of Public Schools, Manila, Philippines. Tel. 3-34-88.

PORTUGAL:

PROJECT FOR A MODERN TEACHING OF CHEMISTRY IN SECONDARY SCHOOLS.

CONTACT: Prof. F. Pinto-Coelho, Project for a Modern Teaching of Chemistry in Secondary Schools, The Chemical Laboratory, University of Coimbra, Coimbra, Portugal.

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DEVELOPMENT OF A CORE-COURSE FOR COLLEGE SCIENCE MAJORS COMBINING MATERIAL FROM INTRODUCTORY COURSES IN BIOLOGY, CHEMISTRY AND PHYSICS - PHASE III.

CONTACT: Arnold D. Pickar, Portland State College, Portland, Oregon 97201. Tel. (503)226-7271, Ext. 337.

FUTURE-ORIENTED CURRICULUM - UNION SCHOOLS (FOCUS).

CONTACT: Mr. Paul A. Jennings, FOCUS, Union School District, 5175 Union Avenue, San Jose, California 95124. Tel. (408)377-8010.

ILLINOIS INSTITUTE OF TECHNOLOGY, SECONDARY SCHOOL COMPUTER SCIENCE EDUCATION (SSCSE), OPERATION COMPU/TEL.

CONTACT: Mr. Charles R. Bauer, Director, SSCSE, IIT Computation Center, 3200 South Wabash, Chicago, Illinois 60616.
Tel. (312)225-9600, Ext. 1233.

IOWA SCIENCE AND CULTURE PROJECT (ISCP).

CONTACT: Robert E. Yager and George W. Cossman, Science Education, University of Iowa, Iowa City, Iowa 52240. Tel. (319)353-3600.

PENNSYLVANIA SCIENCE IN ACTION PROGRAM.

CONTACT: Joseph E. Anthony, Pennsylvania Science In Action Program, Department of Public Instruction, Bureau of General and Academic Education, Box 911, Harrisburg, Pennsylvania 17126.

PROBLEM SOLVING PROJECT.

CONTACT: Dr. Howard Sullivan, Problem Solving Project, Southwest Regional Laboratory, 11300 La Cienega Boulevard, Inglewood, California 90403. Tel. (213)776-3800.

RADIATION SCIENCE SEMINAR.

CONTACT: John W. Sulcoski, 80 N. Washington Street, Wilkes-Barre, Pennsylvania 18701. Tel. (717)825-6881, Ext. 247.

UNIVERSITY OF MARYLAND MATHEMATICS PROJECT (UMMaP).

CONTACT: Henry H. Walbesser, Director, University of Maryland Mathematics Project, College of Education, University of Maryland, College Park, Maryland 20740. James H. Henkelman, Associate Director. Tel. (301)454-2031.

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INDIVIDUALLY PRESCRIBED MATHEMATICS INSTRUCTION (IPI Math).
CONTACT: Dr. John Bolvin, Learning Research & Development Center, 160 N. Craig St., University of Pittsburgh, Pittsburgh, Pennsylvania 15213. Tel. 412-683-8640.